DESCRIPTION

ENZYMATIC NUCLEIC ACID TREATMENT OF DISEASES OR CONDITIONS RELATED TO HEPATITIS C VIRUS INFECTION

This patent application is a continuation-in-part of Blatt *et al.*, USSN (not yet assigned), filed July 7, 2000, which is a continuation-in-part of Blatt *et al.*, 09/504,321, filed February 15, 2000, which is a continuation-in-part of Blatt *et al.*, USSN 09/274,553, filed March 23, 1999, which is a continuation-in-part of Blatt *et al.*, USSN 09/257,608, filed February 24, 1999 (abandoned), which claims priority from Blatt *et al.*, USSN 60/100,842, filed September 18, 1998, and McSwiggen *et al.*, USSN 60/083,217 filed April 27, 1998, all of these earlier applications are entitled "ENZYMATIC NUCLEIC ACID TREATMENT OF DISEASES OR CONDITIONS RELATED TO HEPATITIS C VIRUS INFECTION". Each of these applications are hereby incorporated by reference herein in their entirety including the drawings.

Technical Field Of The Invention

This invention relates to methods and reagents for the treatment of diseases or conditions relating to the hepatitis C virus infection.

Background Of The Invention

The following is a discussion of relevant art, none of which is admitted to be prior art to the present invention.

In 1989, the Hepatitis C Virus (HCV) was determined to be an RNA virus and was identified as the causative agent of most non-A non-B viral Hepatitis (Choo *et al., Science.* 1989; 244:359-362). Unlike retroviruses such as HIV, HCV does not go though a DNA replication phase and no integrated forms of the viral genome into the host chromosome have been detected (Houghton *et al., Hepatology* 1991;14:381-388). Rather, replication of the coding (plus) strand is mediated by the production of a replicative (minus) strand leading to the generation of several copies of plus strand HCV RNA. The genome consists of a single, large, open-reading frame that is translated into a polyprotein (Kato *et al., FEBS Letters.* 1991;

280: 325-328). This polyprotein subsequently undergoes post-translational cleavage, producing several viral proteins (Leinbach *et al., Virology*. 1994: 204:163-169).

Examination of the 9.5-kilobase genome of HCV has demonstrated that the viral nucleic acid can mutate at a high rate (Smith *et al.,Mol. Evol.* 1997 45:238-246). This rate of mutation has led to the evolution of several distinct genotypes of HCV that share approximately 70% sequence identity (Simmonds *et al., J. Gen. Virol.* 1994;75 :1053-1061). It is important to note that these sequences are evolutionarily quite distant. For example, the genetic identity between humans and primates such as the chimpanzee is approximately 98%. In addition, it has been demonstrated that an HCV infection in an individual patient is composed of several distinct and evolving quasispecies that have 98% identity at the RNA level. Thus, the HCV genome is hypervariable and continuously changing. Although the HCV genome is hypervariable, there are 3 regions of the genome that are highly conserved. These conserved sequences occur in the 5' and 3' non-coding regions as well as the 5'-end of the core protein coding region and are thought to be vital for HCV RNA replication as well as translation of the HCV polyprotein. Thus, therapeutic agents that target these conserved HCV genomic regions may have a significant impact over a wide range of HCV genotypes. Moreover, it is unlikely that drug resistance will occur with enzymatic nucleic acids specific to conserved regions of the HCV genome. In contrast, therapeutic modalities that target inhibition of enzymes such as the viral proteases or helicase are likely to result in the selection for drug resistant strains since the RNA for these viral encoded enzymes is located in the hypervariable portion of the HCV genome.

After initial exposure to HCV, the patient will experience a transient rise in liver enzymes, which indicates that inflammatory processes are occurring (Alter *et al.,* IN: Seeff LB, Lewis JH, eds. *Current Perspectives in Hepatology*. New York: Plenum Medical Book Co; 1989:83-89). This elevation in liver enzymes will occur at least 4 weeks after the initial exposure and may last for up to two months (Farci *et al., New England Journal of Medicine.* 1991:325:98-104). Prior to the rise in liver enzymes, it is possible to detect HCV RNA in the patient's serum using RT-PCR analysis (Takahashi *et al., American Journal of Gastroenterology.* 1993:88:2:240-243). This stage of the disease is called the acute stage and usually goes undetected since 75% of patients with acute viral hepatitis from HCV infection are asymptomatic. The remaining 25% of these patients develop jaundice or other symptoms of hepatitis.

Acute HCV infection is a benign disease, however, and as many as 80% of acute HCV patients progress to chronic liver disease as evidenced by persistent elevation of serum alanine aminotransferase (ALT) levels and by continual presence of circulating HCV RNA (Sherlock, *Lancet* 1992; 339:802). The natural progression of chronic HCV infection over a 10 to 20 year period leads to cirrhosis in 20 to 50% of patients (Davis *et al., Infectious Agents and Disease* 1993;2:150:154) and progression of HCV infection to hepatocellular carcinoma has been well documented (Liang *et al., Hepatology.* 1993; 18:1326-1333; Tong *et al., Western Journal of Medicine*, 1994; Vol. 160, No. 2: 133-138). There have been no studies that have determined sub-populations that are most likely to progress to cirrhosis and/or hepatocellular carcinoma, thus all patients have equal risk of progression.

It is important to note that the survival for patients diagnosed with hepatocellular carcinoma is only 0.9 to 12.8 months from initial diagnosis (Takahashi *et al., American Journal of Gastroenterology.* 1993:88:2:240-243). Treatment of hepatocellular carcinoma with chemotherapeutic agents has not proven effective and only 10% of patients will benefit from surgery due to extensive tumor invasion of the liver (Trinchet *et al., Presse Medicine.* 1994:23:831-833). Given the aggressive nature of primary hepatocellular carcinoma, the only viable treatment alternative to surgery is liver transplantation (Pichlmayr *et al., Hepatology.* 1994:20:33S-40S).

Upon progression to cirrhosis, patients with chronic HCV infection present with clinical features, which are common to clinical cirrhosis regardless of the initial cause (D'Amico *et al., Digestive Diseases and Sciences.* 1986;31:5: 468-475). These clinical features may include: bleeding esophageal varices, ascites, jaundice, and encephalopathy (Zakim D, Boyer TD. Hepatology a textbook of liver disease. Second Edition Volume 1. 1990 W.B. Saunders Company. Philadelphia). In the early stages of cirrhosis, patients are classified as compensated meaning that although liver tissue damage has occurred, the patient's liver is still able to detoxify metabolites in the blood-stream. In addition, most patients with compensated liver disease are asymptomatic and the minority with symptoms report only minor symptoms such as dyspepsia and weakness. In the later stages of cirrhosis, patients are classified as decompensated meaning that their ability to detoxify metabolites in the bloodstream is diminished and it is at this stage that the clinical features described above will present.

In 1986, D'Amico *et al.* described the clinical manifestations and survival rates in 1155 patients with both alcoholic and viral associated cirrhosis (D'Amico *supra*). Of the 1155 patients, 435 (37%) had compensated disease although 70% were asymptomatic at the beginning of the study. The remaining 720 patients (63%) had decompensated liver disease with 78% presenting with a history of ascites, 31% with jaundice, 17% had bleeding and 16% had encephalopathy. Hepatocellular carcinoma was observed in six (.5%) patients with compensated disease and in 30 (2.6%) patients with decompensated disease.

Over the course of six years, the patients with compensated cirrhosis developed clinical features of decompensated disease at a rate of 10% per year. In most cases, ascites was the first presentation of decompensation. In addition, hepatocellular carcinoma developed in 59 patients who initially presented with compensated disease by the end of the six-year study.

With respect to survival, the D'Amico study indicated that the five-year survival rate for all patients on the study was only 40%. The six-year survival rate for the patients who initially had compensated cirrhosis was 54% while the six-year survival rate for patients who initially presented with decompensated disease was only 21%. There were no significant differences in the survival rates between the patients who had alcoholic cirrhosis and the patients with viral related cirrhosis. The major causes of death for the patients in the D'Amico study were liver failure in 49%; hepatocellular carcinoma in 22%; and, bleeding in 13% (D'Amico *supra*).

Chronic Hepatitis C is a slowly progressing inflammatory disease of the liver, mediated by a virus (HCV) that can lead to cirrhosis, liver failure and/or hepatocellular carcinoma over a period of 10 to 20 years. In the US, it is estimated that infection with HCV accounts for 50,000 new cases of acute hepatitis in the United States each year (NIH Consensus Development Conference Statement on Management of Hepatitis C March 1997). The prevalence of HCV in the United States is estimated at 1.8% and the CDC places the number of chronically infected Americans at approximately 4.5 million people. The CDC also estimates that up to 10,000 deaths per year are caused by chronic HCV infection. The prevalence of HCV in the United States is estimated at 1.8% and the CDC places the number

of chronically infected Americans at approximately 4.5 million people. The CDC also estimates that up to 10,000 deaths per year are caused by chronic HCV infection.

Numerous well controlled clinical trials using interferon (IFN-alpha) in the treatment of chronic HCV infection have demonstrated that treatment three times a week results in lowering of serum ALT values in approximately 50% (range 40% to 70%) of patients by the end of 6 months of therapy (Davis *et al., New England Journal of Medicine* 1989; 321:1501-1506; Marcellin *et al., Hepatology*. 1991; 13:393-397; Tong *et al., Hepatology* 1997:26:747-754; Tong *et al., Hepatology* 1997 26(6): 1640-1645). However, following cessation of interferon treatment, approximately 50% of the responding patients relapsed, resulting in a "durable" response rate as assessed by normalization of serum ALT concentrations of approximately 20 to 25%.

In recent years, direct measurement of the HCV RNA has become possible through use of either the branched-DNA or Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) analysis. In general, the RT-PCR methodology is more sensitive and leads to more accurate assessment of the clinical course (Tong *et al., supra*). Studies that have examined six months of type 1 interferon therapy using changes in HCV RNA values as a clinical endpoint have demonstrated that up to 35% of patients will have a loss of HCV RNA by the end of therapy (Marcellin *et al., supra*). However, as with the ALT endpoint, about 50% of the patients relapse six months following cessation of therapy resulting in a durable virologic response of only 12% (Marcellin *et al., supra*). Studies that have examined 48 weeks of therapy have demonstrated that the sustained virological response is up to 25% (NIH consensus statement: 1997). Thus, standard of care for treatment of chronic HCV infection with type 1 interferon is now 48 weeks of therapy using changes in HCV RNA concentrations as the primary assessment of efficacy (Hoofnagle *et al., New England Journal of Medicine* 1997; 336(5) 347-356).

Side effects resulting from treatment with type 1 interferons can be divided into four general categories, which include 1. Influenza-like symptoms; 2. Neuropsychiatric; 3. Laboratory abnormalities; and, 4. Miscellaneous (Dusheiko *et al.,* Journal of Viral Hepatitis. 1994:1:3-5). Examples of influenza-like symptoms include; fatigue, fever; myalgia; malaise; appetite loss; tachycardia; rigors; headache and arthralgias. The influenza-like symptoms are usually short-lived and tend to abate after the first four weeks of dosing (Dushieko *et al.,*

supra). Neuropsychiatric side effects include: irritability, apathy; mood changes; insomnia; cognitive changes and depression. The most important of these neuropsychiatric side effects is depression and patients who have a history of depression should not be given type 1 interferon. Laboratory abnormalities include; reduction in myeloid cells including granulocytes, platelets and to a lesser extent red blood cells. These changes in blood cell counts rarely lead to any significant clinical sequellae (Dushieko *et al., supra*). In addition, increases in triglyceride concentrations and elevations in serum alanine and aspartate aminotransferase concentration have been observed. Finally, thyroid abnormalities have been reported. These thyroid abnormalities are usually reversible after cessation of interferon therapy and can be controlled with appropriate medication while on therapy. Miscellaneous side effects include nausea; diarrhea; abdominal and back pain; pruritus; alopecia; and rhinorrhea. In general, most side effects will abate after 4 to 8 weeks of therapy (Dushieko *et al., supra*).

Welch *et al., Gene Therapy* 1996 3(11): 994-1001 describe *in vitro* an *in vivo* studies with two vector expressed hairpin ribozymes targeted against hepatitis C virus.

Sakamoto *et al., J. Clinical Investigation* 1996 98(12): 2720-2728 describe intracellular cleavage of hepatitis C virus RNA and inhibition of viral protein translation by certain vector expressed hammerhead ribozymes.

Lieber *et al., J. Virology* 1996 70(12): 8782-8791 describe elimination of hepatitis C virus RNA in infected human hepatocytes by adenovirus-mediated expression of certain hammerhead ribozymes.

Ohkawa *et al.,* 1997, *J. Hepatology*, 27; 78-84, describe *in vitro* cleavage of HCV RNA and inhibition of viral protein translation using certain *in vitro* transcribed hammerhead ribozymes.

Barber *et al.,* International PCT Publication No. *WO 97/32018*, describe the use of an adenovirus vector to express certain anti-hepatitis C virus hairpin ribozymes.

Kay *et al.,* International PCT Publication No. *WO 96/18419*, describe certain recombinant adenovirus vectors to express anti-HCV hammerhead ribozymes.

Yamada *et al.,* Japanese Patent Application No. *JP 07231784* describe a specific poly-(L)-lysine conjugated hammerhead ribozyme targeted against HCV.

Draper, U.S. Patent Nos. 5,610,054 and 5,869,253, describes enzymatic nucleic acid molecules capable of inhibiting replication of HCV.

Macejak *et al.,* 2000, *Hepatology,* 31, 769-776, describe enzymatic nucleic acid molecules capable of inhibiting replication of HCV.

SUMMARY OF THE INVENTION

This invention relates to enzymatic nucleic acid molecules directed to cleave RNA species of hepatitis C virus (HCV) and/or encoded by the HCV. In particular, applicant describes the selection and function of enzymatic nucleic acid molecules capable of specifically cleaving HCV RNA. Such enzymatic nucleic acid molecules may be used to treat diseases associated with HCV infection.

Due to the high sequence variability of the HCV genome, selection of enzymatic nucleic acid molecules for broad therapeutic applications would likely involve the conserved regions of the HCV genome. Specifically, the present invention describes enzymatic nucleic acid molecules that would cleave in the conserved regions of the HCV genome. Examples of conserved regions of the HCV genome include but are not limited to the 5'-Non Coding Region (NCR), the 5'-end of the core protein coding region, and the 3'- NCR. HCV genomic RNA contains an internal ribosome entry site (IRES) in the 5'-NCR which mediates translation independently of a 5'-cap structure (Wang *et al.,* 1993, *J. Virol.,* 67, 3338-44). The full-length sequence of the HCV RNA genome is heterologous among clinically isolated subtypes, of which there are at least 15 (Simmonds, 1995, *Hepatology,* 21, 570-583), however, the 5'-NCR sequence of HCV is highly conserved across all known subtypes, most likely to preserve the shared IRES mechanism (Okamoto *et al.,* 1991, *J. General Virol.,* 72, 2697-2704) In general, enzymatic nucleic acid molecules that cleave sites located in the 5' end of the HCV genome would be expected to block translation while enzymatic nucleic acid molecules that cleave sites located in the 3' end of the genome would be expected to block RNA replication. Therefore, one enzymatic nucleic acid molecule can be designed to cleave all the different isolates of HCV. According to the Applicant, enzymatic nucleic acid molecules designed against conserved regions of various HCV isolates will enable efficient inhibition of HCV replication in diverse patient populations and may ensure the effectiveness of the enzymatic nucleic acid molecules against HCV quasi species which evolve due to mutations in the non-conserved regions of the HCV genome.

In another preferred embodiment, the invention features the use of an enzymatic nucleic acid molecule, preferably in the hammerhead, NCH (Inozyme), G-cleaver, amberzyme, zinzyme and/or DNAzyme motif, to inhibit the expression of HCV RNA.

In yet another preferred embodiment, the invention features the use of an enzymatic nucleic acid molecule, preferably in the hammerhead, Inozyme, G-cleaver, amberzyme, zinzyme and/or DNAzyme motif, to inhibit the expression of HCV minus strand RNA.

By "inhibit" it is meant that the activity of HCV or level of RNAs or equivalent RNAs encoding one or more protein subunits of HCV is reduced below that observed in the absence of the nucleic acid molecules of the invention. In one embodiment, inhibition with enzymatic nucleic acid molecule preferably is below that level observed in the presence of an enzymatically inactive or attenuated molecule that is able to bind to the same site on the target RNA, but is unable to cleave that RNA. In another embodiment, inhibition of HCV genes with the nucleic acid molecule of the instant invention is greater than in the presence of the nucleic acid molecule than in its absence.

By "enzymatic nucleic acid molecule" it is meant a nucleic acid molecule which has complementarity in a substrate binding region to a specified gene target, and also has an enzymatic activity which is active to specifically cleave target RNA. That is, the enzymatic nucleic acid molecule is able to intermolecularly cleave RNA and thereby inactivate a target RNA molecule. These complementary regions allow sufficient hybridization of the enzymatic nucleic acid molecule to the target RNA and thus permit cleavage. One hundred percent complementarity is preferred, but complementarity as low as 50-75% may also be useful in this invention. The nucleic acids may be modified at the base, sugar, and/or phosphate groups. The term enzymatic nucleic acid is used interchangeably with phrases such as enzymatic nucleic acids, catalytic RNA, enzymatic RNA, catalytic DNA, aptazyme or aptamer-binding enzymatic nucleic acid, regulatable enzymatic nucleic acid, allosteric catalytic nucleic acid, allosteric enzymatic nucleic acid, allosteric ribozyme, catalytic oligonucleotides, nucleozyme, DNAzyme, RNA enzyme, endoribonuclease, endonuclease, minizyme, leadzyme, oligozyme or DNA enzyme. All of these terminologies describe nucleic acid molecules with enzymatic activity. The specific enzymatic nucleic acid molecules described in the instant application are not meant to be limiting and those skilled in the art will recognize that all that is important in an enzymatic nucleic acid molecule of this invention is that it have a specific substrate binding site which is complementary to one or more of the target nucleic acid regions, and that it have nucleotide sequences within or surrounding that substrate binding site which

impart a nucleic acid cleaving activity to the molecule (Cech *et al.*, U.S. Patent No. 4,987,071; Cech *et al.*, 1988, JAMA).

By "nucleic acid molecule" as used herein is meant a molecule having nucleotides. The nucleic acid can be single, double, or multiple stranded and may comprise modified or unmodified nucleotides or non-nucleotides or various mixtures and combinations thereof.

By "enzymatic portion" or "catalytic domain" is meant that portion/region of the enzymatic nucleic acid essential for cleavage of a nucleic acid substrate (for example see Figure 1).

By "substrate binding arm" or "substrate binding domain" is meant that portion/region of an enzymatic nucleic acid which is complementary to (*i.e.*, able to base-pair with) a portion of its substrate. Generally, such complementarity is 100%, but can be less if desired. For example, as few as 10 bases out of 14 may be base-paired. Such arms are shown generally in Figure 1 and 3. That is, these arms contain sequences within an enzymatic nucleic acid which are intended to bring enzymatic nucleic acid and target RNA together through complementary base-pairing interactions. The enzymatic nucleic acid of the invention may have binding arms that are contiguous or non-contiguous and may be of varying lengths. The length of the binding arm(s) are preferably greater than or equal to four nucleotides; specifically 12-100 nucleotides; more specifically 14-24 nucleotides long. If two binding arms are chosen, the design is such that the length of the binding arms are symmetrical (*i.e.*, each of the binding arms is of the same length; *e.g.*, five and five nucleotides, six and six nucleotides or seven and seven nucleotides long) or asymmetrical (*i.e.*, the binding arms are of different length; *e.g.*, six and three nucleotides; three and six nucleotides long; four and five nucleotides long; four and six nucleotides long; four and seven nucleotides long; and the like).

By "Inozyme" or "NCH" motif is meant, an enzymatic nucleic acid molecule comprising a motif as is generally described in **Figure 1** and in Ludwig *et al.*, International PCT publication Nos. WO 98/58058 and WO 98/58057. Inozymes possess endonuclease activity to cleave RNA substrates having a cleavage triplet NCH/, where N is a nucleotide, C is cytidine and H is adenosine, uridine or cytidine, and / represents the cleavage site. H is used interchangeably with X. Inozymes can also possess endonuclease activity to cleave RNA substrates having a cleavage triplet NCN/, where N is a nucleotide, C is cytidine, and /

represents the cleavage site. "I" in **Figure 1** represents an Inosine nucleotide, preferably a ribo-Inosine or xylo-Inosine nucleotide.

By "G-cleaver" motif is meant, an enzymatic nucleic acid molecule comprising a motif as is generally described in **Figure 2** and in Eckstein *et al.,* International PCT publication No. WO/9916871. G-cleavers possess endonuclease activity to cleave RNA substrates having a cleavage triplet NYN/, where N is a nucleotide, Y is uridine or cytidine and / represents the cleavage site. G-cleavers may be chemically modified as is generally shown in **Figure 2**. G-cleavers can be used, for example, to cleave RNA substrates after an AUG/ triplet, where A is adenosine, U is uridine, G is guanosine, and / represents the cleavage site.

By "zinzyme" motif is meant, an enzymatic nucleic acid molecule comprising a motif as is generally described in **Figure 3** and in Beigelman *et al.,* International PCT publication No. WO/9955857. Zinzymes possess endonuclease activity to cleave RNA substrates having a cleavage triplet including but not limited to YG/Y, where Y is uridine or cytidine, and G is guanosine and / represents the cleavage site. Zinzymes may be chemically modified to increase nuclease stability through chemical modifications or substitutions as generally shown in **Figure 3**, including substituting 2'-O-methyl guanosine nucleotides for guanosine nucleotides. In addition, differing nucleotide and/or non-nucleotide linkers can be used to substitute the 5'-gaaa-2' loop shown in the figure. Zinzymes represent a non-limiting example of an enzymatic nucleic acid molecule that does not require a ribonucleotide (2'-OH) group within its own nucleic acid sequence for activity.

By "amberzyme" motif is meant, an enzymatic nucleic acid molecule comprising a motif as is generally described in **Figure 4** and in Beigelman *et al.,* International PCT publication No. WO/9955857. Amberzymes possess endonuclease activity to cleave RNA substrates having a cleavage triplet NG/N, where N is a nucleotide, G is guanosine, and / represents the cleavage site. Amberzymes may be chemically modified to increase nuclease stability through substitutions as are generally shown in **Figure 4**. In addition, differing nucleoside and/or non-nucleoside linkers can be used to substitute the 5'-gaaa-3' loops shown in the figure. Amberzymes represent a non-limiting example of an enzymatic nucleic acid molecule that does not require a ribonucleotide (2'-OH) group within its own nucleic acid sequence for activity.

By 'DNAzyme' is meant, an enzymatic nucleic acid molecule that does not require the presence of a 2'-OH group for its activity. In particular embodiments the enzymatic nucleic acid molecule may have an attached linker(s) or other attached or associated groups, moieties, or chains containing one or more nucleotides with 2'-OH groups. DNAzymes can be synthesized chemically or expressed endogenously *in vivo,* by means of a single stranded DNA vector or equivalent thereof. An example of a DNAzyme is shown in **Figure 5** and is generally reviewed in Usman *et al.*, International PCT Publication No. WO 95/11304; Chartrand *et al.*, 1995, *NAR* 23, 4092; Breaker *et al.*, 1995, *Chem. Bio.* 2, 655; Santoro *et al.*, 1997, *PNAS* 94, 4262; Breaker, 1999, *Nature Biotechnology,* 17, 422-423; and Santoro *et. al.,* 2000, *J. Am. Chem. Soc.,* 122, 2433-39. Additional DNAzyme motifs can be selected by using techniques similar to those described in these references, and hence, are within the scope of the present invention.

By "sufficient length" is meant an oligonucleotide of greater than or equal to 3 nucleotides.

By "stably interact" is meant, interaction of the oligonucleotides with target nucleic acid (*e.g.,* by forming hydrogen bonds with complementary nucleotides in the target under physiological conditions).

By "equivalent" RNA to HCV is meant to include those naturally occurring RNA molecules associated with HCV infection in various animals, including human, rodent, primate, rabbit and pig. The equivalent RNA sequence also includes in addition to the coding region, regions such as 5'-untranslated region, 3'-untranslated region, introns, intron-exon junction and the like.

By "homology" is meant the nucleotide sequence of two or more nucleic acid molecules is partially or completely identical.

In one of the preferred embodiments of the inventions described herein, the enzymatic nucleic acid molecule is formed in a hammerhead or hairpin motif, but may also be formed in the motif of a hepatitis delta virus, group I intron, group II intron or RNase P RNA (in association with an RNA guide sequence), DNAzymes, NCH cleaving motifs (inozymes), or G-cleavers. Examples of such hammerhead motifs (Figure 1a) are described in Dreyfus,

supra, Rossi *et al.*, 1992, *AIDS Research and Human Retroviruses* 8, 183; Examples of hairpin motifs are described in Hampel *et al.*, EP0360257, Hampel and Tritz, 1989 *Biochemistry* 28, 4929, Feldstein *et al.,* 1989, *Gene* 82, 53, Haseloff and Gerlach, 1989, *Gene*, 82, 43, Hampel *et al.*, 1990 *Nucleic Acids Res.* 18, 299; Chowrira & McSwiggen, US. Patent No. 5,631,359. The hepatitis delta virus motif is generally described in Perrotta and Been, 1992 *Biochemistry* 31, 16. The RNase P motif is generally described in Guerrier-Takada *et al.*, 1983 *Cell* 35, 849; Forster and Altman, 1990, *Science* 249, 783; Li and Altman, 1996, *Nucleic Acids Res.* 24, 835. Examples of group II introns are generally described in Griffin *et al.,* 1995, *Chem. Biol.* 2, 761; Michels and Pyle, 1995, *Biochemistry* 34, 2965; Pyle *et al.,* International PCT Publication No. WO 96/22689. The Group I intron is generally described in Cech *et al.*, U.S. Patent 4,987,071. DNAzymes (Figure 4) are generally described in Usman *et al.*, International PCT Publication No. WO 95/11304; Chartrand *et al.*, 1995, *NAR* 23, 4092; Breaker *et al.*, 1995, *Chem. Bio.* 2, 655; Santoro *et al.*, 1997, *PNAS* 94, 4262; Breaker, 1999, *Nature Biotechnology,* 17, 422-423; Santoro *et. al.,* 2000, *J. Am. Chem. Soc.,* 122, 2433-39). NCH cleaving motifs (Figure 1b) are generally described in Ludwig & Sproat, International PCT Publication No. WO 98/58058; and G-cleavers (Figure 1c) are generally described in Kore *et al.*, 1998, *Nucleic Acids Research* 26, 4116-4120 and Eckstein *et al.,* International PCT Publication No. WO 99/16871. Additional motifs contemplated by the instant invention include the Allozyme or allosteric enzymatic nucleic acid molecule (Breaker *et al.,* WO 98/43993, Shih *et. al.,* U.S. Patent 5,589,332, George *et al.,* U.S. Patent 5,741,679), Amberzyme (Figure 2, Class I motif in Beigelman *et al.,* International PCT publication No. WO 99/55857) and Zinzyme (Figure 3, Class II motif in Beigelman *et al.,* International PCT publication No. WO 99/55857), all these references are incorporated by reference herein in their totalities, including drawings and can also be used in the present invention. These specific motifs are not limiting in the invention. Those skilled in the art will recognize that all that is important is that the enzymatic molecule have a specific substrate binding site which is complementary to one or more of the target gene RNA regions, and that it have nucleotide sequences within or surrounding that substrate binding site which impart an RNA cleaving activity to the molecule (Cech *et al.*, U.S. Patent No. 4,987,071).

By "complementarity" is meant that a nucleic acid can form hydrogen bond(s) with another RNA sequence by either traditional Watson-Crick or other non-traditional types. In

reference to the nucleic molecules of the present invention, the binding free energy for a nucleic acid molecule with its target or complementary sequence is sufficient to allow the relevant function of the nucleic acid to proceed, e.g., enzymatic nucleic acid cleavage. Determination of binding free energies for nucleic acid molecules is well known in the art (see, e.g., Turner et al., 1987, CSH Symp. Quant. Biol. LII pp.123-133; Frier et al., 1986, Proc. Nat. Acad. Sci. USA 83:9373-9377; Turner et al., 1987, J. Am. Chem. Soc. 109:3783-3785). A percent complementarity indicates the percentage of contiguous residues in a nucleic acid molecule which can form hydrogen bonds (e.g., Watson-Crick base pairing) with a second nucleic acid sequence (e.g., 5, 6, 7, 8, 9, 10 out of 10 being 50%, 60%, 70%, 80%, 90%, and 100% complementary). "Perfectly complementary" means that all the contiguous residues of a nucleic acid sequence will hydrogen bond with the same number of contiguous residues in a second nucleic acid sequence.

In a preferred embodiment the invention provides a method for producing a class of enzymatic cleaving agents which exhibit a high degree of specificity for the RNA of a desired target. The enzymatic nucleic acid molecule is preferably targeted to a highly conserved sequence region of a target mRNAs encoding HCV proteins such that specific treatment of a disease or condition can be provided with either one or several enzymatic nucleic acids. Such enzymatic nucleic acid molecules can be delivered exogenously to specific cells as required. Alternatively, the enzymatic nucleic acid molecules can be expressed from DNA/RNA vectors that are delivered to specific cells. DNAzymes can be synthesized chemically or expressed endogenously *in vivo,* by means of a single stranded DNA vector or equivalent thereof.

By "highly conserved sequence region" is meant, a nucleotide sequence of one or more regions in a target gene does not vary significantly from one generation to the other or from one biological system to the other.

Such enzymatic nucleic acid molecules are useful for the prevention of the diseases and conditions discussed above, and any other diseases or conditions that are related to the levels of HCV activity in a cell or tissue.

By "related" is meant that the inhibition of HCV RNAs and thus reduction in the level respective viral activity will relieve to some extent the symptoms of the disease or condition.

In preferred embodiments, the enzymatic nucleic acid molecules have binding arms which are complementary to the target sequences in **Tables III-V.** Examples of such enzymatic nucleic acid molecules are also shown in **Tables III-VI.** Examples of such enzymatic nucleic acid molecules consist essentially of sequences defined in these tables. Other sequences may be present which do not interfere with such cleavage.

By "consists essentially of" is meant that the active enzymatic nucleic acid molecule of the invention contains an enzymatic center or core equivalent to those in the examples, and binding arms able to bind RNA such that cleavage at the target site occurs. Other sequences may be present which do not interfere with such cleavage. Thus, a core region may, for example, include one or more loop or stem-loop structures, which do not prevent enzymatic activity. Such sequences can be designated as "X", for example, as in a loop or stem/loop structure. A core sequence for a hammerhead enzymatic nucleic acid can be CUGAUGAG X CGAA where X=GCCGUUAGGC or other stem II region known in the art. Similarly, for other enzymatic nucleic acid molecules of the instant invention, additional sequences may be present that do not interfere with the function of the nucleic acid molecule.

X may be a linker of ≥ 2 nucleotides in length, preferably 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 26, 30, where the nucleotides may preferably be internally base-paired to form a stem of preferably ≥ 2 base pairs. Alternatively or in addition, X may be a non-nucleotide linker. In yet another embodiment, the nucleotide linker (X) can be a nucleic acid aptamer, such as an ATP aptamer, HIV Rev aptamer (RRE), HIV Tat aptamer (TAR) and others (for a review see Gold *et al.,* 1995, *Annu. Rev. Biochem.,* 64, 763; and Szostak & Ellington, 1993, in *The RNA World,* ed. Gesteland and Atkins, pp. 511, CSH Laboratory Press). A "nucleic acid aptamer" as used herein is meant to indicate a nucleic acid sequence capable of interacting with a ligand. The ligand can be any natural or a synthetic molecule, including but not limited to a resin, metabolites, nucleosides, nucleotides, drugs, toxins, transition state analogs, peptides, lipids, proteins, amino acids, nucleic acid molecules, hormones, carbohydrates, receptors, cells, viruses, bacteria and others.

In yet another embodiment, the non-nucleotide linker (X) is as defined herein. The term "non-nucleotide" as used herein include either abasic nucleotide, polyether, polyamine, polyamide, peptide, carbohydrate, lipid, or polyhydrocarbon compounds. Specific examples include those described by Seela and Kaiser, *Nucleic Acids Res.* 1990, *18*:6353 and *Nucleic Acids Res.* 1987, *15*:3113; Cload and Schepartz, *J. Am. Chem. Soc.* 1991, *113*:6324; Richardson and Schepartz, *J. Am. Chem. Soc.* 1991, *113*:5109; Ma et al., *Nucleic Acids Res.* 1993, *21*:2585 and *Biochemistry* 1993, *32*:1751; Durand et al., *Nucleic Acids Res.* 1990,

18:6353; McCurdy et al., *Nucleosides & Nucleotides* 1991, *10*:287; Jschke et al., *Tetrahedron Lett.* 1993, *34*:301; Ono et al., *Biochemistry* 1991, *30*:9914; Arnold *et al.*, International Publication No. WO 89/02439; Usman *et al.*, International Publication No. WO 95/06731; Dudycz *et al.*, International Publication No. WO 95/11910 and Ferentz and Verdine, *J. Am. Chem. Soc.* 1991, *113*:4000, all hereby incorporated by reference herein. A "non-nucleotide" further means any group or compound which can be incorporated into a nucleic acid chain in the place of one or more nucleotide units, including either sugar and/or phosphate substitutions, and allows the remaining bases to exhibit their enzymatic activity. The group or compound can be abasic in that it does not contain a commonly recognized nucleotide base, such as adenosine, guanine, cytosine, uracil or thymine. Thus, in a preferred embodiment, the invention features an enzymatic nucleic acid molecule having one or more non-nucleotide moieties, and having enzymatic activity to cleave an RNA or DNA molecule.

Thus, in a first aspect, the invention features enzymatic nucleic acid molecules that inhibit gene expression and/or viral replication. These chemically or enzymatically synthesized nucleic acid molecules contain substrate binding domains that bind to accessible regions of their target mRNAs. The nucleic acid molecules also contain domains that catalyze the cleavage of RNA. The enzymatic nucleic acid molecules are preferably molecules of the hammerhead, Inozyme, DNAzyme, Zinzyme, Amberzyme, and/or G-cleaver motifs. Upon binding, the enzymatic nucleic acid molecules cleave the target mRNAs, preventing translation and protein accumulation. In the absence of the expression of the target gene, HCV gene expression and/or replication is inhibited.

In a preferred embodiment, enzymatic nucleic acid molecules are added directly, or can be complexed with cationic lipids, packaged within liposomes, or otherwise delivered to target cells. The nucleic acid or nucleic acid complexes can be locally administered to relevant tissues ex vivo, or in vivo through injection, infusion pump or stent, with or without their incorporation in biopolymers. In another preferred embodiment, the enzymatic nucleic acid molecule is administered to the site of HCV activity (e.g., hepatocytes) in an appropriate liposomal vehicle.

In another aspect of the invention, enzymatic nucleic acid molecules that cleave target molecules and inhibit HCV activity are expressed from transcription units inserted into DNA or RNA vectors. The recombinant vectors are preferably DNA plasmids or viral vectors. Enzymatic nucleic acid molecule expressing viral vectors could be constructed based on, but

not limited to, adeno-associated virus, retrovirus, adenovirus, or alphavirus. Preferably, the recombinant vectors capable of expressing the enzymatic nucleic acid molecules are delivered as described above, and persist in target cells. Alternatively, viral vectors may be used that provide for transient expression of enzymatic nucleic acid molecules. Such vectors might be repeatedly administered as necessary. Once expressed, the enzymatic nucleic acid molecules cleave the target mRNA. Delivery of enzymatic nucleic acid molecule expressing vectors could be systemic, such as by intravenous or intramuscular administration, by administration to target cells ex-planted from the patient followed by reintroduction into the patient, or by any other means that would allow for introduction into the desired target cell (for a review see Couture and Stinchcomb, 1996, *TIG.,* 12, 510). In another aspect of the invention, enzymatic nucleic acid molecules that cleave target molecules and inhibit viral replication are expressed from transcription units inserted into DNA, RNA, or viral vectors. Preferably, the recombinant vectors capable of expressing the enzymatic nucleic acid molecules are locally delivered as described above, and transiently persist in smooth muscle cells. However, other mammalian cell vectors that direct the expression of RNA may be used for this purpose.

By "patient" is meant an organism which is a donor or recipient of explanted cells or the cells themselves. "Patient" also refers to an organism to which enzymatic nucleic acid molecules can be administered. Preferably, a patient is a mammal or mammalian cells. More preferably, a patient is a human or human cells.

As used in herein "cell" is used in its usual biological sense, and does not refer to an entire multicellular organism, e.g., specifically does not refer to a human. The cell may be present in a non-human multicellular organism, e.g., birds, plants and mammals such as cows, sheep, apes, monkeys, swine, dogs, and cats.

By RNA is meant a molecule comprising at least one ribonucleotide residue. By "ribonucleotide" is meant a nucleotide with a hydroxyl group at the 2' position (eg; 2'-OH) of a β-D-ribo-furanose moiety.

By "vectors" is meant any nucleic acid- and/or viral-based technique used to deliver a desired nucleic acid.

These enzymatic nucleic acid molecules, individually, or in combination or in conjunction with other drugs, can be used to treat diseases or conditions discussed above. For example, to treat a disease or condition associated with HCV levels, the patient may be treated, or other appropriate cells may be treated, as is evident to those skilled in the art.

In a further embodiment, the described molecules can be used in combination with other known treatments to treat conditions or diseases discussed above. For example, the described molecules could be used in combination with one or more known therapeutic agents to treat liver failure, hepatocellular carcinoma, cirrhosis, and/or other disease states associated with HCV infection. Additional known therapeutic agents are those comprising antivirals, interferon, and/or antisense compounds.

By "comprising" is meant including, but not limited to, whatever follows the word "comprising". Thus, use of the term "comprising" indicates that the listed elements are required or mandatory, but that other elements are optional and may or may not be present. By "consisting of" is meant including, and limited to, whatever follows the phrase "consisting of". Thus, the phrase "consisting of" indicates that the listed elements are required or mandatory, and that no other elements may be present. By "consisting essentially of" is meant including any elements listed after the phrase, and limited to other elements that do not interfere with or contribute to the activity or action specified in the disclosure for the listed elements. Thus, the phrase "consisting essentially of" indicates that the listed elements are required or mandatory, but that other elements are optional and may or may not be present depending upon whether or not they affect the activity or action of the listed elements.

Other features and advantages of the invention will be apparent from the following description of the preferred embodiments thereof, and from the claims.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The drawings will first briefly be described.

Drawings:

Figure 1 is a diagrammatic representation of a Hammerhead and an Inozyme motif. The examples shown are chemically stabilized with 2'-O-methyl substitutions (lower case), a 2'-deoxy-2'-C-allyl Uridine substitution at position U-4, and a 3'-terminal inverted deoxyabasic moiety. Conserved ribonucleotides are shown as rN, for example G-5, A-6, G-8, G-2, and I-15.1. Phosphorothioate internucleotide substitutions can be introduced, for example, at the four terminal 5' end nucleotides for increased stability to nuclease degradation. Stem II can be ≥ 2 base-pair long, preferably, 2, 3, 4, 5, 6, 7, 8, and 10 base-pairs long. Each N and N' is independently any base or non-nucleotide as used herein; X is adenosine, cytidine or uridine; Stems I-III are meant to indicate three stem-loop structures; stems I-III can be of any length and may be symmetrical or asymmetrical; arrow indicates the site of cleavage in the target RNA; Rz refers to enzymatic nucleic acid; Loop II may be present or absent. If Loop II is present it is greater than or equal to three nucleotides, preferably four nucleotides. The Loop II sequence is preferably 5'-GAAA-3' or 5'-GUUA-3'. Inozyme position 15.1 comprises an Inosine nucleotide, which can be ribo-Inosine or xylo-Inosine.

Figure 2 is a diagrammatic representation of a G-cleaver motif. The example shown is chemically stabilized with 2'-O-methyl substitutions, phosphorothioate internucleotide linkage substitutions, and a 3'-termianl inverted deoxyabasic moiety. In the figure, lower case a, g, c, and u represent 2'-O-methyl adenosine, guanosine, cytidine, and uridine nucleotides respectively; upper case A, G, C and U represent adenosine, guanosine, cytidine and uridine nucleotides respectively; "s" refers to phosphorothioate internucleotide linkages, and iB represents an 3'-terminal inverted deoxyabasic moiety.

Figure 3 is a diagrammatic representation of a zinzyme motif. The example shown is chemically stabilized with 2'-O-methyl substitutions, phosphorothioate internucleotide linkage substitutions, and a 3'-termianl inverted deoxyabasic moiety. C in the figure represents a 2'-deozy-2'-amino cytidine nucleotide; lower case a, g, c, and u represent 2'-O-methyl adenosine, guanosine, cytidine, and uridine nucleotides respectively; uppercase A, G, C and U represent adenosine, guanosine, cytidine and uridine nucleotides respectively; "s" refers to phosphorothioate internucleotide linkages, and iB represents an 3'-terminal inverted deoxyabasic moiety. All of the ribo-guanosine nucleotides in the zinzyme motif can be replaced with 2'-O-methyl guanosine nucleotides. The 5'-gaaa-3' loop can be replaced with other nucleotide containing loop structures and/or non-nucleotide linkers, including PEG linkers. The guanosine nucleotide represented as G' in the figure can be replaced with either

2'-O-methyl guanosine, 5'-cytidine-adenosine-3', or 5'-cytidine-adenosine-adenosine-3' nucleotides and/or their corresponding 2'-O-methyl nucleotide derivatives.

Figure 4 is a diagrammatic representation of an amberzyme motif. The example shown is chemically stabilized with 2'-O-methyl substitutions and a 3'-termianl inverted deoxyabasic moiety. C in the figure represents a 2'-deozy-2'-amino cytidine nucleotide; lower case a, g, c, and u represent 2'-O-methyl adenosine, guanosine, cytidine, and uridine nucleotides respectively; uppercase A, G, C and U represent adenosine, guanosine, cytidine and uridine nucleotides respectively; and iB represents an 3'-terminal inverted deoxyabasic moiety. The amberzyme motif can be further stabilized through introducing phosphorothioate internucleotide linkages, for example at the four terminal 5'-internucleotide linkages.

Figure 5 is a diagrammatic representation of a DNAzyme motif described generally, for example in Santoro *et al.*, 1997, *PNAS,* 94, 4262.

Figure 6 is a schematic representation of the Dual Reporter System utilized to demonstrate enzymatic nucleic acid mediated reduction of luciferase activity in cell culture.

Figure 7 shows a schematic view of the secondary structure of the HCV 5'UTR (Brown *et al.,* 1992, *Nucleic Acids Res.,* 20, 5041-45; Honda *et al.,* 1999, *J. Virol.,* 73, 1165-74). Major structural domains are indicated in bold. Enzymatic nucleic acid cleavage sites are indicated by arrows. Solid arrows denote sites amenable to amino-modified enzymatic nucleic acid inhibition. Lead cleavage sites (195 and 330) are indicated with oversized solid arrows.

Figure 8 shows a non-limiting example of a nuclease resistant enzymatic nucleic acid molecule. Binding arms are indicated as stem I and stem III. Nucleotide modifications are indicated as follows: 2'-O-methyl nucleotides, lowercase; ribonucleotides, uppercase G, A; 2' -amino-uridine, u; inverted 3'-3' deoxyabasic, **B**. The positions of phosphorothioate linkages at the 5'-end of each enzymatic nucleic acid are indicated by subscript "s". *H* indicates A, C or U ribonucleotide, *N'* indicates A, C G or U ribonucleotide in substrate, *n* indicates base complementary to the N'. The U4 and U7 positions in the catalytic core are indicated.

Figure 9 is a set of bar graphs showing enzymatic nucleic acid mediated inhibition of HCV-luciferase expression in OST7 cells. OST7 cells were transfected with complexes containing reporter plasmids (2 μg/mL), enzymatic nucleic acids (100 nM) and lipid. The

ratio of HCV-firefly luciferase luminescence/Renilla luciferase luminescence was determined for each enzymatic nucleic acid tested and was compared to treatment with the ICR, an irrelevant control enzymatic nucleic acid lacking specificity to the HCV 5'UTR (adjusted to 1). Results are reported as the mean of triplicate samples ± SD. In **Figure 9A**, OST7 cells were treated with enzymatic nucleic acids (100 nM) targeting conserved sites (indicated by cleavage site) within the HCV 5'UTR. In **Figure 9B**, OST7 cells were treated with a subset of enzymatic nucleic acids to lead HCV sites (indicated by cleavage site) and corresponding attenuated core (AC) controls. Percent decrease in firefly/Renilla luciferase ratio after treatment with active enzymatic nucleic acids as compared to treatment with corresponding ACs is shown when the decrease is ≥ 50% and statistically significant. Similar results were obtained with 50 nM enzymatic nucleic acid.

Figure 10 is a series of line graphs showing the dose-dependent inhibition of HCV/luciferase expression following enzymatic nucleic acid treatment. Active enzymatic nucleic acid was mixed with corresponding AC to maintain a 100 nM total oligonucleotide concentration and the same lipid charge ratio. The concentration of active enzymatic nucleic acid for each point is shown. **Figure 10A–E** shows enzymatic nucleic acids targeting sites 79, 81, 142, 195, or 330, respectively. Results are reported as the mean of triplicate samples ± SD.

Figure 11 is a set of bar graphs showing reduction of HCV/luciferase RNA and inhibition of HCV-luciferase expression in OST7 cells. OST7 cells were transfected with complexes containing reporter plasmids (2 μg /ml), enzymatic nucleic acids, BACs or SACs (50 nM) and lipid. Results are reported as the mean of triplicate samples ± SD. In **Figure 11A** the ratio of HCV-firefly luciferase RNA/Renilla luciferase RNA is shown for each enzymatic nucleic acid or control tested. As compared to paired BAC controls (adjusted to 1), luciferase RNA levels were reduced by 40% and 25% for the site 195 or 330 enzymatic nucleic acids, respectively. In **Figure 11B** the ratio of HCV-firefly luciferase luminescence/Renilla luciferase luminescence is shown after treatment with site 195 or 330 enzymatic nucleic acids or paired controls. As compared to paired BAC controls (adjusted to 1), inhibition of protein expression was 70% and 40% for the site 195 or 330 enzymatic nucleic acids, respectively $P < 0.01$.

Figure 12 is a set a bar graphs showing interferon (IFN) alpha 2a and 2b dose response in combination with site 195 anti-HCV enzymatic nucleic acid treatment. **Figure 12A** shows data for IFN alfa 2a treatment. **Figure 12B** shows data for IFN alfa 2b treatment. Viral yield is reported from HeLa cells pretreated with IFN in units/ml (U/ml) as indicated for 4 h prior to infection and then treated with either 200 nM control (SAC) or site 195 anti-HCV enzymatic nucleic acid (195 RZ) for 24 h after infection. Cells were infected with a MOI = 0.1 for 30 min and collected at 24 h post infection. Error bars represent the S.D. of the mean of triplicate determinations.

Figure 13 is a line graph showing site 195 anti-HCV enzymatic nucleic acid dose response in combination with interferon (IFN) alpha 2a and 2b pretreatment. Viral yield is reported from HeLa cells pretreated for 4 h with or without IFN and treated with doses of site 195 anti-HCV enzymatic nucleic acid (195 RZ) as indicated for 24 h after infection. Anti-HCV enzymatic nucleic acid was mixed with control oligonucleotide (SAC) to maintain a constant 200 nM total dose of nucleic acid for delivery. Cells were infected with a MOI = 0.1 for 30 min and collected at 24 h post infection. Error bars represent the S.D. of the mean of triplicate determinations.

Figure 14 is a set of bar graphs showing data from consensus interferon (CIFN)/enzymatic nucleic acid combination treatment. **Figure 14 A** shows CIFN dose response with site 195 anti-HCV enzymatic nucleic acid treatment. Viral yield is reported from cells pretreated with CIFN in units/ml (U/ml) as indicated and treated with either 200 nM control (SAC) or site 195 anti-HCV enzymatic nucleic acid (195 RZ). **Figure 14B** shows site 195 anti-HCV enzymatic nucleic acid dose response with CIFN pretreatment. Viral yield is reported from cells pretreated with or without CIFN and treated with concentrations of site 195 anti-HCV enzymatic nucleic acid (195 RZ) as indicated. Anti-HCV enzymatic nucleic acid was mixed with control oligonucleotide (SAC) to maintain a constant 200 nM total dose of nucleic acid for delivery. Cells were infected with a MOI = 0.1 for 30 min. and collected at 24 h post infection. Error bars represent the S.D. of the mean of triplicate determinations.

Figure 15 is a bar graph showing enzymatic nucleic acid activity and enhanced antiviral effect of an anti-HCV enzymatic nucleic acid targeting site 195 used in combination with consensus interferon (CIFN). Viral yield is reported from cells treated as indicated.

BAC, cells were treated with 200 nM BAC (binding attenuated control) for 24 h after infection; CIFN+BAC, cells were treated with 12.5 U/ml CIFN for 4 h prior to infection and with 200 nM BAC for 24 h after infection; 195 RZ, cells were treated with 200 nM site 195 anti-HCV enzymatic nucleic acid for 24 h after infection; CIFN + 195 RZ, cells were treated with 12.5 U/ml CIFN for 4 h prior to infection and with 200 nM site 195 anti-HCV enzymatic nucleic acid for 24 h after infection. Cells were infected with a MOI = 0.1 for 30 min. Error bars represent the S.D. of the mean of triplicate determinations.

Figure 16 is a bar graph showing inhibition of a HCV-PV chimera replication by treatment with zinzyme enzymatic nucleic acid molecules targeting different sites within the HCV 5'-UTR compared to a scrambled attenuated core control (SAC) zinzyme.

Figure 17 is a bar graph showing inhibition of a HCV-PV chimera replication by antisense nucleic acid molecules targeting conserved regions of the HCV 5'-UTR compared to scrambled antisense controls.

Enzymatic Nucleic Acid Molecules

There are several known classes of enzymatic nucleic acid molecules capable of cleaving target RNA. In addition, several *in vitro* selection (evolution) strategies (Orgel, 1979, *Proc. R. Soc. London,* B 205, 435) have been used to evolve new nucleic acid catalysts capable of catalyzing cleavage and ligation of phosphodiester linkages (Joyce, 1989, *Gene,* 82, 83-87; Beaudry *et al.,* 1992, *Science* 257, 635-641; Joyce, 1992, *Scientific American* 267, 90-97; Breaker *et al.,* 1994, *TIBTECH* 12, 268; Bartel *et al.,*1993, *Science* 261:1411-1418; Szostak, 1993, *TIBS* 17, 89-93; Kumar *et al.,* 1995, *FASEB J.,* 9, 1183; Breaker, 1996, *Curr. Op. Biotech.*, 7, 442; Santoro *et al.,* 1997, *Proc. Natl. Acad. Sci.,* 94, 4262; Tang *et al.,* 1997, *RNA* 3, 914; Nakamaye & Eckstein, 1994, *supra*; Long &Uhlenbeck, 1994, supra; Ishizaka et al., 1995, *supra*; Vaish *et al.,* 1997, *Biochemistry* 36, 6495; all of these are incorporated by reference herein). Each can catalyze a series of reactions including the hydrolysis of phosphodiester bonds in *trans* (and thus can cleave other RNA molecules) under physiological conditions. **Table I** summarizes some of the characteristics of some of these enzymatic nucleic acids. In general, enzymatic nucleic acids act by first binding to a target RNA. Such binding occurs through the target binding portion of an enzymatic nucleic acid which is held in close proximity to an enzymatic portion of the molecule that acts to cleave

the target RNA. Thus, the enzymatic nucleic acid first recognizes and then binds a target RNA through complementary base-pairing, and once bound to the correct site, acts enzymatically to cut the target RNA. Strategic cleavage of such a target RNA will destroy its ability to direct synthesis of an encoded protein. After an enzymatic nucleic acid has bound and cleaved its RNA target, it is released from that RNA to search for another target and can repeatedly bind and cleave new targets.

The enzymatic nature of an enzymatic nucleic acid molecule is advantageous over other technologies, since the concentration of enzymatic nucleic acid molecule necessary to affect a therapeutic treatment is lower. This advantage reflects the ability of the enzymatic nucleic acid molecule to act enzymatically. Thus, a single enzymatic nucleic acid molecule is able to cleave many molecules of target RNA. In addition, the enzymatic nucleic acid molecule is a highly specific inhibitor, with the specificity of inhibition depending not only on the base-pairing mechanism of binding to the target RNA, but also on the mechanism of target RNA cleavage. Single mismatches, or base-substitutions, near the site of cleavage can be chosen to completely eliminate catalytic activity of an enzymatic nucleic acid molecule.

Nucleic acid molecules having an endonuclease enzymatic activity are able to repeatedly cleave other separate RNA molecules in a nucleotide base sequence-specific manner. Such enzymatic nucleic acid molecules can be targeted to virtually any RNA transcript, and efficient cleavage achieved *in vitro* (Zaug *et al.*, 324, *Nature* 429 1986 ; Uhlenbeck, 1987 *Nature* 328, 596; Kim et al., 84 *Proc. Natl. Acad. Sci. USA* 8788, 1987; Dreyfus, 1988, *Einstein Quart. J. Bio. Med.*, 6, 92; Haseloff and Gerlach, 334 *Nature* 585, 1988; Cech, 260 *JAMA* 3030, 1988; and Jefferies et al., 17 *Nucleic Acids Research* 1371, 1989; Chartrand *et al.*, 1995, *Nucleic Acids Research* 23, 4092; Santoro *et al.*, 1997, *PNAS* 94, 4262).

Because of their sequence-specificity, *trans*-cleaving enzymatic nucleic acid molecules show promise as therapeutic agents for human disease (Usman & McSwiggen, 1995 *Ann. Rep. Med. Chem.* **30**, 285-294; Christoffersen and Marr, 1995 *J. Med. Chem.* **38**, 2023-2037). Enzymatic nucleic acid molecules can be designed to cleave specific RNA targets within the background of cellular RNA. Such a cleavage event renders the RNA non-

functional and abrogates protein expression from that RNA. In this manner, synthesis of a protein associated with a disease state can be selectively inhibited.

Enzymatic nucleic acid molecules that cleave the specified sites in HCV RNAs represent a novel therapeutic approach to infection by the hepatitis C virus. As shown herein, enzymatic nucleic acids are able to inhibit the activity of HCV and the catalytic activity of the enzymatic nucleic acids is required for their inhibitory effect. Those of ordinary skill in the art will find that it is clear from the examples described that other enzymatic nucleic acid molecules that cleave HCV RNAs may be readily designed and are within the invention.

Target sites

Targets for useful enzymatic nucleic acid molecules can be determined as disclosed in Draper *et al.,* WO 93/23569; Sullivan *et al.,* WO 93/23057; Thompson *et al.,* WO 94/02595; Draper *et al.,* WO 95/04818; McSwiggen *et al.,* US Patent No. 5,525,468 and hereby incorporated by reference herein in totality. Rather than repeat the guidance provided in those documents here, below are provided specific examples of such methods, not limiting to those in the art. Enzymatic nucleic acid molecules to such targets are designed as described in those applications and synthesized to be tested *in vitro* and *in vivo*, as also described. Such enzymatic nucleic acid molecules can also be optimized and delivered as described therein.

The sequence of HCV RNAs were screened for optimal enzymatic nucleic acid molecule target sites using a computer folding algorithm. Enzymatic nucleic acid cleavage sites were identified. These sites are shown in **Tables III-V** (All sequences are 5' to 3' in the tables). The nucleotide base position is noted in the tables as that site to be cleaved by the designated type of enzymatic nucleic acid molecule. The nucleotide base position is noted in the tables as that site to be cleaved by the designated type of enzymatic nucleic acid molecule.

Because HCV RNAs are highly homologous in certain regions, some enzymatic nucleic acid molecule target sites are also homologous. In this case, a single enzymatic nucleic acid molecule will target different classes of HCV RNA. The advantage of one enzymatic nucleic acid molecule that targets several classes of HCV RNA is clear, especially in cases where one or more of these RNAs may contribute to the disease state.

Enzymatic nucleic acid molecules were designed that could bind and were individually analyzed by computer folding (Jaeger *et al.*, 1989 *Proc. Natl. Acad. Sci. USA*, 86, 7706) to assess whether the enzymatic nucleic acid molecule sequences fold into the appropriate secondary structure. Those enzymatic nucleic acid molecules with unfavorable intramolecular interactions between the binding arms and the catalytic core are eliminated from consideration. Varying binding arm lengths can be chosen to optimize activity. Generally, at least 5 bases on each arm are able to bind to, or otherwise interact with, the target RNA. Enzymatic nucleic acid molecules were designed to anneal to various sites in the mRNA message. The binding arms are complementary to the target site sequences described above.

Nucleic acid Synthesis

Synthesis of nucleic acids greater than 100 nucleotides in length is difficult using automated methods, and the therapeutic cost of such molecules is prohibitive. In this invention, small nucleic acid motifs ("small refers to nucleic acid motifs no more than 100 nucleotides in length, preferably no more than 80 nucleotides in length, and most preferably no more than 50 nucleotides in length; *e.g.*, antisense oligonucleotides, hammerhead or the Inozyme enzymatic nucleic acids) are preferably used for exogenous delivery. The simple structure of these molecules increases the ability of the nucleic acid to invade targeted regions of RNA structure. Exemplary molecules of the instant invention are chemically synthesized, and others can similarly be synthesized.

The method of synthesis used for normal RNA including certain enzymatic nucleic acid molecules follows the procedure as described in Usman *et al.*, 1987, *J. Am. Chem. Soc.*, 109, 7845; Scaringe *et al.*, 1990, *Nucleic Acids Res.*, 18, 5433; and Wincott *et al.*, 1995, *Nucleic Acids Res.* 23, 2677-2684 Wincott *et al.*, 1997, *Methods Mol. Bio.*, 74, 59, and makes use of common nucleic acid protecting and coupling groups, such as dimethoxytrityl at the 5'-end, and phosphoramidites at the 3'-end. In a non-limiting example, small scale syntheses are conducted on a 394 Applied Biosystems, Inc. synthesizer using a 0.2 μmol scale protocol with a 7.5 min coupling step for alkylsilyl protected nucleotides and a 2.5 min coupling step for 2'-O-methylated nucleotides. **Table II** outlines the amounts and the contact times of the reagents used in the synthesis cycle. Alternatively, syntheses at the 0.2 μmol scale can be

done on a 96-well plate synthesizer, such as the instrument produced by Protogene (Palo Alto, CA) with minimal modification to the cycle. A 33-fold excess (60 μL of 0.11 M = 6.6 μmol) of 2'-O-methyl phosphoramidite and a 75-fold excess of S-ethyl tetrazole (60 μL of 0.25 M = 15 μmol) can be used in each coupling cycle of 2'-O-methyl residues relative to polymer-bound 5'-hydroxyl. A 66-fold excess (120 μL of 0.11 M = 13.2 μmol) of alkylsilyl (ribo) protected phosphoramidite and a 150-fold excess of S-ethyl tetrazole (120 μL of 0.25 M = 30 μmol) can be used in each coupling cycle of ribo residues relative to polymer-bound 5'-hydroxyl. Average coupling yields on the 394 Applied Biosystems, Inc. synthesizer, determined by colorimetric quantitation of the trityl fractions, are typically 97.5-99%. Other oligonucleotide synthesis reagents for the 394 Applied Biosystems, Inc. synthesizer include; detritylation solution is 3% TCA in methylene chloride (ABI); capping is performed with 16% *N*-methyl imidazole in THF (ABI) and 10% acetic anhydride/10% 2,6-lutidine in THF (ABI); oxidation solution is 16.9 mM I_2, 49 mM pyridine, 9% water in THF (PERSEPTIVE™). Burdick & Jackson Synthesis Grade acetonitrile is used directly from the reagent bottle. S-Ethyltetrazole solution (0.25 M in acetonitrile) is made up from the solid obtained from American International Chemical, Inc. Alternately, for the introduction of phosphorothioate linkages, Beaucage reagent (3H-1,2-Benzodithiol-3-one 1,1-dioxide0.05 M in acetonitrile) is used.

Deprotection of the RNA is performed using either a two-pot or one-pot protocol. For the two-pot protocol, the polymer-bound trityl-on oligoribonucleotide is transferred to a 4 mL glass screw top vial and suspended in a solution of 40% aq. methylamine (1 mL) at 65 °C for 10 min. After cooling to –20 °C, the supernatant is removed from the polymer support. The support is washed three times with 1.0 mL of EtOH:MeCN:H2O/3:1:1, vortexed and the supernatant is then added to the first supernatant. The combined supernatants, containing the oligoribonucleotide, are dried to a white powder. The base deprotected oligoribonucleotide is resuspended in anhydrous TEA/HF/NMP solution (300 μL of a solution of 1.5 mL N-methylpyrrolidinone, 750 μL TEA and 1 mL TEA•3HF to provide a 1.4 M HF concentration) and heated to 65 °C. After 1.5 h, the oligomer is quenched with 1.5 M NH_4HCO_3.

Alternatively, for the one-pot protocol, the polymer-bound trityl-on oligoribonucleotide is transferred to a 4 mL glass screw top vial and suspended in a solution of 33% ethanolic methylamine/DMSO: 1/1 (0.8 mL) at 65 °C for 15 min. The vial is brought

to r.t. TEA•3HF (0.1 mL) is added and the vial is heated at 65 °C for 15 min. The sample is cooled at –20 °C and then quenched with 1.5 M NH_4HCO_3.

For anion exchange desalting of the deprotected oligomer, the TEAB solution was loaded onto a Qiagen 500® anion exchange cartridge (Qiagen Inc.) that was prewashed with 50 mM TEAB (10 mL). After washing the loaded cartridge with 50 mM TEAB (10 mL), the RNA was eluted with 2 M TEAB (10 mL) and dried down to a white powder.

For purification of the trityl-on oligomers, the quenched NH_4HCO_3 solution is loaded onto a C-18 containing cartridge that had been prewashed with acetonitrile followed by 50 mM TEAA. After washing the loaded cartridge with water, the RNA is detritylated with 0.5% TFA for 13 min. The cartridge is then washed again with water, salt exchanged with 1 M NaCl and washed with water again. The oligonucleotide is then eluted with 30% acetonitrile.

Inactive hammerhead enzymatic nucleic acids were synthesized by substituting switching the order of G_5A_6 and substituting a U for A_{14}(numbering from Hertel, K. J., *et al.*, 1992, *Nucleic Acids Res.*, 20, 3252). Inactive enzymatic nucleic acids may also be synthesized by substituting a U for G5 and a U for A14. In some cases, the sequence of the substrate binding arms were randomized while the overall base composition was maintained.

The average stepwise coupling yields are typically >98% (Wincott *et al.*, 1995 *Nucleic Acids Res.* 23, 2677-2684). Those of ordinary skill in the art will recognize that the scale of synthesis can be adapted to be larger or smaller than the example described above including but not limited to 96 well format, all that is important is the ratio of chemicals used in the reaction.

Enzymatic nucleic acid molecules can be synthesized in two parts and annealed to reconstruct the active enzymatic nucleic acid molecule (Chowrira and Burke, 1992 *Nucleic Acids Res.*, 20, 2835-2840). Enzymatic nucleic acid molecules can also be synthesized from DNA templates using bacteriophage T7 RNA polymerase (Milligan and Uhlenbeck, 1989, *Methods Enzymol.* 180, 51). DNAzymes can be synthesized chemically or expressed endogenously *in vivo,* by means of a single stranded DNA vector or equivalent thereof.

Alternatively, the nucleic acid molecules of the present invention can be synthesized separately and joined together post-synthetically, for example by ligation (Moore *et al.*, 1992, *Science* 256, 9923; Draper *et al.*, International PCT publication No. WO 93/23569; Shabarova *et al.*, 1991, *Nucleic Acids Research* 19, 4247; Bellon *et al.*, 1997, *Nucleosides & Nucleotides*, 16, 951; Bellon *et al.*, 1997, *Bioconjugate Chem.* 8, 204).

The nucleic acid molecules of the present invention are modified extensively to enhance stability by modification with nuclease resistant groups, for example, 2'-amino, 2'-*C*-allyl, 2'-flouro, 2'-*O*-methyl, 2'-H (for a review see Usman and Cedergren, 1992, *TIBS* 17, 34; Usman *et al.*, 1994, *Nucleic Acids Symp. Ser.* 31, 163). Enzymatic nucleic acids are purified by gel electrophoresis using general methods or are purified by high pressure liquid chromatography (HPLC; See Wincott *et al.*, Supra, the totality of which is hereby incorporated herein by reference) and are re-suspended in water.

The sequences of the nucleic acid molecules that are chemically synthesized, useful in this study, are shown in **Tables V-VII**. Those in the art will recognize that these sequences are representative only of many more such sequences where the enzymatic portion of the enzymatic nucleic acid (all but the binding arms) is altered to affect activity. The nucleic acid sequences listed in **Tables V-VII** may be formed of ribonucleotides or other nucleotides or non-nucleotides. Such nucleic acid molecules with enzymatic activity are equivalent to the enzymatic nucleic acid molecules described specifically in the tables.

Optimizing Activity of the nucleic acid molecules of the invention.

Chemically synthesizing nucleic acid molecules with modifications (base, sugar and/or phosphate) that prevent their degradation by serum ribonucleases may increase their potency (see *e.g.*, Eckstein *et al.*, International Publication No. WO 92/07065; Perrault *et al.*, 1990 *Nature* 344, 565; Pieken et al., 1991, *Science* 253, 314; Usman and Cedergren, 1992, *Trends in Biochem. Sci.* 17, 334; Usman *et al.*, International Publication No. WO 93/15187; and Rossi *et al.*, International Publication No. WO 91/03162; Sproat, US Patent No. 5,334,711; and Burgin *et al., supra;* all of these describe various chemical modifications that can be made to the base, phosphate and/or sugar moieties of the nucleic acid molecules herein). Modifications which enhance their efficacy in cells, and removal of bases from nucleic acid molecules to shorten oligonucleotide synthesis times and reduce chemical

requirements are desired. (All these publications are hereby incorporated by reference herein).

There are several examples in the art describing sugar, base and phosphate modifications that can be introduced into nucleic acid molecules with significant enhancement in their nuclease stability and efficacy. For example, oligonucleotides are modified to enhance stability and/or enhance biological activity by modification with nuclease resistant groups, for example, 2'-amino, 2'-*C*-allyl, 2'-flouro, 2'-*O*-methyl, 2'-H, nucleotide base modifications (for a review see Usman and Cedergren, 1992, *TIBS.* 17, 34; Usman *et al.,* 1994, *Nucleic Acids Symp. Ser.* 31, 163; Burgin *et al.,* 1996, *Biochemistry* , 35, 14090). Sugar modification of nucleic acid molecules have been extensively described in the art (see Eckstein *et al.*, *International Publication* PCT No. WO 92/07065; Perrault *et al. Nature,* 1990, *344*, 565-568; Pieken *et al. Science,* 1991, *253*, 314-317; Usman and Cedergren, *Trends in Biochem. Sci.* , 1992, *17*, 334-339; Usman *et al. International Publication* PCT No. WO 93/15187; Sproat, *US Patent* No. 5,334,711 and Beigelman *et al.,* 1995, *J. Biol. Chem.,* 270, 25702; Beigelman *et al.,* International PCT publication No. WO 97/26270; Beigelman *et al.,* US Patent No. 5,716,824; Usman *et al.,* US patent No. 5,627,053; Woolf *et al.*, International PCT Publication No. WO 98/13526; Thompson *et al.*, USSN 60/082,404 which was filed on April 20, 1998; Karpeisky *et al.,* 1998, *Tetrahedron Lett.*, 39, 1131; Earnshaw and Gait, 1998, *Biopolymers (Nucleic acid Sciences),* 48, 39-55; Verma and Eckstein, 1998, *Annu. Rev. Biochem.,* 67, 99-134; and Burlina *et al.,* 1997, *Bioorg. Med. Chem.,* 5, 1999-2010; all of the references are hereby incorporated in their totality by reference herein). Such publications describe general methods and strategies to determine the location of incorporation of sugar, base and/or phosphate modifications and the like into enzymatic nucleic acids without inhibiting catalysis, and are incorporated by reference herein. In view of such teachings, similar modifications can be used as described herein to modify the nucleic acid molecules of the instant invention.

While chemical modification of oligonucleotide internucleotide linkages with phosphorothioate, phosphorothioate, and/or 5'-methylphosphonate linkages improves stability, too many of these modifications may cause some toxicity. Therefore when designing nucleic acid molecules the amount of these internucleotide linkages should be

minimized. The reduction in the concentration of these linkages should lower toxicity resulting in increased efficacy and higher specificity of these molecules.

Nucleic acid molecules having chemical modifications that maintain or enhance activity are provided. Such nucleic acid is also generally more resistant to nucleases than unmodified nucleic acid. Thus, in a cell and/or *in vivo* the activity may not be significantly lowered. Therapeutic nucleic acid molecules delivered exogenously must optimally be stable within cells until translation of the target RNA has been inhibited long enough to reduce the levels of the undesirable protein. This period of time varies between hours to days depending upon the disease state. Clearly, nucleic acid molecules must be resistant to nucleases in order to function as effective intracellular therapeutic agents. Improvements in the chemical synthesis of RNA and DNA (Wincott *et al.*, 1995 *Nucleic Acids Res.* 23, 2677; Caruthers *et al.*, 1992, *Methods in Enzymology* 211,3-19 (incorporated by reference herein) have expanded the ability to modify nucleic acid molecules by introducing nucleotide modifications to enhance their nuclease stability as described above.

Use of these the nucleic acid-based molecules of the invention will lead to better treatment of the disease progression by affording the possibility of combination therapies (*e.g.,* multiple antisense or enzymatic nucleic acid molecules targeted to different genes, nucleic acid molecules coupled with known small molecule inhibitors, or intermittent treatment with combinations of molecules (including different motifs) and/or other chemical or biological molecules). The treatment of patients with nucleic acid molecules may also include combinations of different types of nucleic acid molecules.

Therapeutic nucleic acid molecules (*e.g.,* enzymatic nucleic acid molecules) delivered exogenously must optimally be stable within cells until translation of the target RNA has been inhibited long enough to reduce the levels of the undesirable protein. This period of time varies between hours to days depending upon the disease state. Clearly, these nucleic acid molecules must be resistant to nucleases in order to function as effective intracellular therapeutic agents. Improvements in the chemical synthesis of nucleic acid molecules described in the instant invention and in the art have expanded the ability to modify nucleic acid molecules by introducing nucleotide modifications to enhance their nuclease stability as described above.

By "enhanced enzymatic activity" is meant to include activity measured in cells and/or *in vivo* where the activity is a reflection of both catalytic activity and enzymatic nucleic acid stability. In this invention, the product of these properties is increased or not significantly (less that 10 fold) decreased *in vivo* compared to an all RNA enzymatic nucleic acid or all DNA enzyme.

In yet another preferred embodiment, nucleic acid catalysts having chemical modifications which maintain or enhance enzymatic activity is provided. Such nucleic acid is also generally more resistant to nucleases than unmodified nucleic acid. Thus, in a cell and/or *in vivo* the activity may not be significantly lowered. As exemplified herein such enzymatic nucleic acids are useful in a cell and/or *in vivo* even if activity over all is reduced 10 fold (Burgin *et al.*, 1996, *Biochemistry*, 35, 14090). Such enzymatic nucleic acids herein are said to "maintain" the enzymatic activity of an all RNA enzymatic nucleic acid.

In another aspect the nucleic acid molecules comprise a 5' and/or a 3'- cap structure.

By "cap structure" is meant chemical modifications, which have been incorporated at either terminus of the oligonucleotide (see for example Wincott *et al.*, WO 97/26270, incorporated by reference herein). These terminal modifications protect the nucleic acid molecule from exonuclease degradation, and may help in delivery and/or localization within a cell. The cap may be present at the 5'-terminus (5'-cap) or at the 3'-terminus (3'-cap) or may be present on both terminus. In non-limiting examples: the 5'-cap is selected from the group comprising inverted abasic residue (moiety), 4',5'-methylene nucleotide; 1-(beta-D-erythrofuranosyl) nucleotide, 4'-thio nucleotide, carbocyclic nucleotide; 1,5-anhydrohexitol nucleotide; L-nucleotides; alpha-nucleotides; modified base nucleotide; phosphorodithioate linkage; *threo*-pentofuranosyl nucleotide; acyclic 3',4'-seco nucleotide; acyclic 3,4-dihydroxybutyl nucleotide; acyclic 3,5-dihydroxypentyl nucleotide, 3'-3'-inverted nucleotide moiety; 3'-3'-inverted abasic moiety; 3'-2'-inverted nucleotide moiety; 3'-2'-inverted abasic moiety; 1,4-butanediol phosphate; 3'-phosphoramidate; hexylphosphate; aminohexyl phosphate; 3'-phosphate; 3'-phosphorothioate; phosphorodithioate; or bridging or non-bridging methylphosphonate moiety (for more details see Wincott *et al.*, International PCT publication No. WO 97/26270, incorporated by reference herein). In yet another preferred embodiment the 3'-cap is selected from a group comprising, 4',5'-methylene nucleotide; 1-

(beta-D-erythrofuranosyl) nucleotide; 4'-thio nucleotide, carbocyclic nucleotide; 5'-amino-alkyl phosphate; 1,3-diamino-2-propyl phosphate, 3-aminopropyl phosphate; 6-aminohexyl phosphate; 1,2-aminododecyl phosphate; hydroxypropyl phosphate; 1,5-anhydrohexitol nucleotide; L-nucleotide; alpha-nucleotide; modified base nucleotide; phosphorodithioate; *threo*-pentofuranosyl nucleotide; acyclic 3',4'-seco nucleotide; 3,4-dihydroxybutyl nucleotide; 3,5-dihydroxypentyl nucleotide, 5'-5'-inverted nucleotide moiety; 5'-5'-inverted abasic moiety; 5'-phosphoramidate; 5'-phosphorothioate; 1,4-butanediol phosphate; 5'-amino; bridging and/or non-bridging 5'-phosphoramidate, phosphorothioate and/or phosphorodithioate, bridging or non bridging methylphosphonate and 5'-mercapto moieties (for more details see Beaucage and Iyer, 1993, *Tetrahedron* 49, 1925; incorporated by reference herein). By the term "non-nucleotide" is meant any group or compound which can be incorporated into a nucleic acid chain in the place of one or more nucleotide units, including either sugar and/or phosphate substitutions, and allows the remaining bases to exhibit their enzymatic activity. The group or compound is abasic in that it does not contain a commonly recognized nucleotide base, such as adenosine, guanine, cytosine, uracil or thymine.

An "alkyl" group refers to a saturated aliphatic hydrocarbon, including straight-chain, branched-chain, and cyclic alkyl groups. Preferably, the alkyl group has 1 to 12 carbons. More preferably it is a lower alkyl of from 1 to 7 carbons, more preferably 1 to 4 carbons. The alkyl group may be substituted or unsubstituted. When substituted the substituted group(s) is preferably, hydroxyl, cyano, alkoxy, =O, =S, NO_2 or $N(CH_3)_2$, amino, or SH. The term also includes alkenyl groups which are unsaturated hydrocarbon groups containing at least one carbon-carbon double bond, including straight-chain, branched-chain, and cyclic groups. Preferably, the alkenyl group has 1 to 12 carbons. More preferably it is a lower alkenyl of from 1 to 7 carbons, more preferably 1 to 4 carbons. The alkenyl group may be substituted or unsubstituted. When substituted the substituted group(s) is preferably, hydroxyl, cyano, alkoxy, =O, =S, NO_2, halogen, $N(CH_3)_2$, amino, or SH. The term "alkyl" also includes alkynyl groups which have an unsaturated hydrocarbon group containing at least one carbon-carbon triple bond, including straight-chain, branched-chain, and cyclic groups. Preferably, the alkynyl group has 1 to 12 carbons. More preferably it is a lower alkynyl of from 1 to 7 carbons, more preferably 1 to 4 carbons. The alkynyl group may be substituted or

unsubstituted. When substituted the substituted group(s) is preferably, hydroxyl, cyano, alkoxy, =O, =S, NO_2 or $N(CH_3)_2$, amino or SH.

Such alkyl groups may also include aryl, alkylaryl, carbocyclic aryl, heterocyclic aryl, amide and ester groups. An "aryl" group refers to an aromatic group which has at least one ring having a conjugated p electron system and includes carbocyclic aryl, heterocyclic aryl and biaryl groups, all of which may be optionally substituted. The preferred substituent(s) of aryl groups are halogen, trihalomethyl, hydroxyl, SH, OH, cyano, alkoxy, alkyl, alkenyl, alkynyl, and amino groups. An "alkylaryl" group refers to an alkyl group (as described above) covalently joined to an aryl group (as described above). Carbocyclic aryl groups are groups wherein the ring atoms on the aromatic ring are all carbon atoms. The carbon atoms are optionally substituted. Heterocyclic aryl groups are groups having from 1 to 3 heteroatoms as ring atoms in the aromatic ring and the remainder of the ring atoms are carbon atoms. Suitable heteroatoms include oxygen, sulfur, and nitrogen, and include furanyl, thienyl, pyridyl, pyrrolyl, N-lower alkyl pyrrolo, pyrimidyl, pyrazinyl, imidazolyl and the like, all optionally substituted. An "amide" refers to an -C(O)-NH-R, where R is either alkyl, aryl, alkylaryl or hydrogen. An "ester" refers to an -C(O)-OR', where R is either alkyl, aryl, alkylaryl or hydrogen.

By "nucleotide" as used herein is as recognized in the art to include natural bases (standard), and modified bases well known in the art. Such bases are generally located at the 1' position of a nucleotide sugar moiety. Nucleotides generally comprise a base, sugar and a phosphate group. The nucleotides can be unmodified or modified at the sugar, phosphate and/or base moiety, (also referred to interchangeably as nucleotide analogs, modified nucleotides, non-natural nucleotides, non-standard nucleotides and other; see for example, Usman and McSwiggen, *supra*; Eckstein *et al.,* International PCT Publication No. WO 92/07065; Usman *et al.,* International PCT Publication No. WO 93/15187; Uhlman & Peyman, *supra* all are hereby incorporated by reference herein). There are several examples of modified nucleic acid bases known in the art as summarized by Limbach *et al.,* 1994, *Nucleic Acids Res.* 22, 2183. Some of the non-limiting examples of base modifications that can be introduced into nucleic acid molecules include, inosine, purine, pyridin-4-one, pyridin-2-one, phenyl, pseudouracil, 2, 4, 6-trimethoxy benzene, 3-methyl uracil, dihydrouridine, naphthyl, aminophenyl, 5-alkylcytidines (*e.g.*, 5-methylcytidine), 5-alkyluridines (*e.g.*,

ribothymidine), 5-halouridine (*e.g.*, 5-bromouridine) or 6-azapyrimidines or 6-alkylpyrimidines (*e.g.* 6-methyluridine), propyne, and others (Burgin *et al.*, 1996, *Biochemistry*, 35, 14090; Uhlman & Peyman, *supra*). By "modified bases" in this aspect is meant nucleotide bases other than adenine, guanine, cytosine and uracil at 1' position or their equivalents; such bases may be used at any position, for example, within the catalytic core of an enzymatic nucleic acid molecule and/or in the substrate-binding regions of the nucleic acid molecule.

In a preferred embodiment, the invention features modified enzymatic nucleic acids with phosphate backbone modifications comprising one or more phosphorothioate, phosphorodithioate, methylphosphonate, morpholino, amidate carbamate, carboxymethyl, acetamidate, polyamide, sulfonate, sulfonamide, sulfamate, formacetal, thioformacetal, and/or alkylsilyl, substitutions. For a review of oligonucleotide backbone modifications see Hunziker and Leumann, 1995, *Nucleic Acid Analogues: Synthesis and Properties,* in *Modern Synthetic Methods,* VCH, 331-417, and Mesmaeker *et al.,* 1994, *Novel Backbone Replacements for Oligonucleotides,* in *Carbohydrate Modifications in Antisense Research,* ACS, 24-39. These references are hereby incorporated by reference herein.

By "abasic" is meant sugar moieties lacking a base or having other chemical groups in place of a base at the 1' position, (for more details see Wincott *et al.,* International PCT publication No. WO 97/26270).

By "unmodified nucleoside" is meant one of the bases adenine, cytosine, guanine, thymine, uracil joined to the 1' carbon of β-D-ribo-furanose.

By "modified nucleoside" is meant any nucleotide base which contains a modification in the chemical structure of an unmodified nucleotide base, sugar and/or phosphate.

In connection with 2'-modified nucleotides as described for the present invention, by "amino" is meant 2'-NH_2 or 2'-*O*- NH_2, which may be modified or unmodified. Such modified groups are described, for example, in Eckstein et al., U.S. Patent 5,672,695 and Matulic-Adamic et al., WO 98/28317, respectively, which are both incorporated by reference in their entireties.

Various modifications to nucleic acid (*e.g.,* antisense and enzymatic nucleic acid) structure can be made to enhance the utility of these molecules. Such modifications will enhance shelf-life, half-life *in vitro,* stability, and ease of introduction of such oligonucleotides to the target site, *e.g.,* to enhance penetration of cellular membranes, and confer the ability to recognize and bind to targeted cells.

Use of these molecules will lead to better treatment of the disease progression by affording the possibility of combination therapies (e.g., multiple enzymatic nucleic acids targeted to different genes, enzymatic nucleic acids coupled with known small molecule inhibitors, or intermittent treatment with combinations of enzymatic nucleic acids (including different enzymatic nucleic acid motifs) and/or other chemical or biological molecules). The treatment of patients with nucleic acid molecules may also include combinations of different types of nucleic acid molecules. Therapies may be devised which include a mixture of enzymatic nucleic acids (including different enzymatic nucleic acid motifs), antisense and/or 2-5A chimera molecules to one or more targets to alleviate symptoms of a disease.

Administration of Nucleic acid molecules

Sullivan *et al.*, PCT WO 94/02595, describes the general methods for delivery of enzymatic nucleic acid molecules. Nucleic acid molecules may be administered to cells by a variety of methods known to those familiar to the art, including, but not restricted to, encapsulation in liposomes, by iontophoresis, or by incorporation into other vehicles, such as hydrogels, cyclodextrins, biodegradable nanocapsules, and bioadhesive microspheres. For some indications, enzymatic nucleic acids may be directly delivered *ex vivo* to cells or tissues with or without the aforementioned vehicles. Alternatively, the RNA/vehicle combination is locally delivered by direct injection or by use of a catheter, infusion pump, stent or other delivery devices such as Alzet® pumps, Medipad® devices. Other routes of delivery include, but are not limited to, intravascular, intramuscular, subcutaneous or joint injection, aerosol inhalation, oral (tablet or pill form), topical, systemic, ocular, intraperitoneal and/or intrathecal delivery. More detailed descriptions of enzymatic nucleic acid delivery and administration are provided in Sullivan *et al.*, supra and Draper *et al.*, PCT WO93/23569 which have been incorporated by reference herein.

The molecules of the instant invention can be used as pharmaceutical agents. Pharmaceutical agents prevent, inhibit the occurrence, or treat (alleviate a symptom to some extent, preferably all of the symptoms) of a disease state in a patient.

The negatively charged polynucleotides of the invention can be administered (*e.g.*, RNA, DNA or protein) and introduced into a patient by any standard means, with or without stabilizers, buffers, and the like, to form a pharmaceutical composition. When it is desired to use a lipid or liposome delivery mechanism, standard protocols for formulation can be followed. The compositions of the present invention may also be formulated and used as tablets, capsules or elixirs for oral administration; suppositories for rectal administration; sterile solutions; suspensions for injectable administration; and the like.

The present invention also includes pharmaceutically acceptable formulations of the compounds described. These formulations include salts of the above compounds, *e.g.*, acid addition salts, for example, salts of hydrochloric, hydrobromic, acetic acid, and benzene sulfonic acid.

A pharmacological composition or formulation refers to a composition or formulation in a form suitable for administration, *e.g.,* systemic administration, into a cell or patient, preferably a human. Suitable forms, in part, depend upon the use or the route of entry, for example oral, transdermal, or by injection. Such forms should not prevent the composition or formulation to reach a target cell (*i.e.*, a cell to which the negatively charged polymer is desired to be delivered to). For example, pharmacological compositions injected into the blood stream should be soluble. Other factors are known in the art, and include considerations such as toxicity and forms which prevent the composition or formulation from exerting its effect.

By "systemic administration" is meant *in* vivo systemic absorption or accumulation of drugs in the blood stream followed by distribution throughout the entire body. Administration routes which lead to systemic absorption include, without limitations: intravenous, subcutaneous, intraperitoneal, inhalation, oral, intrapulmonary and intramuscular. Each of these administration routes expose the desired negatively charged polymers, *e.g.,* nucleic acids, to an accessible diseased tissue. The rate of entry of a drug into the circulation has been shown to be a function of molecular weight or size. The use of a liposome or other drug

carrier comprising the compounds of the instant invention can potentially localize the drug, for example, in certain tissue types, such as the tissues of the reticular endothelial system (RES). A liposome formulation which can facilitate the association of drug with the surface of cells, such as, lymphocytes and macrophages is also useful. This approach may provide enhanced delivery of the drug to target cells by taking advantage of the specificity of macrophage and lymphocyte immune recognition of abnormal cells, such as the HCV infected liver cells.

The invention also features the use of a composition comprising surface-modified liposomes containing poly (ethylene glycol) lipids (PEG-modified, or long-circulating liposomes or stealth liposomes). These formulations offer a method for increasing the accumulation of drugs in target tissues. This class of drug carriers resists opsonization and elimination by the mononuclear phagocytic system (MPS or RES), thereby enabling longer blood circulation times and enhanced tissue exposure for the encapsulated drug (Lasic *et al. Chem. Rev.* 1995, **95**, 2601-2627; Ishiwata *et al., Chem. Pharm. Bull.* 1995, **43**, 1005-1011). Such liposomes have been shown to accumulate selectively in tumors, presumably by extravasation and capture in the neovascularized target tissues (Lasic *et al., Science* 1995, **267**, 1275-1276; Oku *et al.,*1995, *Biochim. Biophys. Acta*, **1238**, 86-90). The long-circulating liposomes enhance the pharmacokinetics and pharmacodynamics of DNA and RNA, particularly compared to conventional cationic liposomes which are known to accumulate in tissues of the MPS (Liu *et al., J. Biol. Chem.* 1995, **42**, 24864-24870; Choi *et al.,* International PCT Publication No. WO 96/10391; Ansell *et al.,* International PCT Publication No. WO 96/10390; Holland *et al.,* International PCT Publication No. WO 96/10392; all of these are incorporated by reference herein). All of these references are incorporated by reference herein.

In addition other cationic molecules may also be utilized to deliver the molecules of the present invention. For example, enzymatic nucleic acid molecules may be conjugated to glycosylated poly(L-lysine) which has been shown to enhance localization of antisense oligonucleotides into the liver (Nakazono *et al.*, 1996, *Hepatology* 23, 1297-1303; Nahato *et al.*, 1997, *Biochem Pharm.* 53, 887-895). Glycosylated poly(L-lysine) may be covently attached to the enzymatic nucleic acid or be bound to enzymatic nucleic acid through electrostatic interaction.

The present invention also includes compositions prepared for storage or administration which include a pharmaceutically effective amount of the desired compounds in a pharmaceutically acceptable carrier or diluent. Acceptable carriers or diluents for therapeutic use are well known in the pharmaceutical art, and are described, for example, in *Remington's Pharmaceutical Sciences*, Mack Publishing Co. (A.R. Gennaro edit. 1985) hereby incorporated by reference herein. For example, preservatives, stabilizers, dyes and flavoring agents may be provided. *Id.* at 1449. These include sodium benzoate, sorbic acid and esters of *p*-hydroxybenzoic acid. In addition, antioxidants and suspending agents may be used. _

A pharmaceutically effective dose is that dose required to prevent, inhibit the occurrence, or treat (alleviate a symptom to some extent, preferably all of the symptoms) a disease state. The pharmaceutically effective dose depends on the type of disease, the composition used, the route of administration, the type of mammal being treated, the physical characteristics of the specific mammal under consideration, concurrent medication, and other factors which those skilled in the medical arts will recognize. Generally, an amount between 0.1 mg/kg and 100 mg/kg body weight/day of active ingredients is administered dependent upon potency of the negatively charged polymer.

The nucleic acid molecules of the present invention may also be administered to a patient in combination with other therapeutic compounds to increase the overall therapeutic effect. The use of multiple compounds to treat an indication may increase the beneficial effects while reducing the presence of side effects.

Alternatively, the enzymatic nucleic acid molecules of the instant invention can be expressed within cells from eukaryotic promoters (*e.g.,* Izant and Weintraub, 1985 *Science* 229, 345; McGarry and Lindquist, 1986 *Proc. Natl. Acad. Sci.* USA 83, 399; Scanlon *et al.,* 1991, *Proc. Natl. Acad. Sci. USA*, 88, 10591-5; Kashani-Sabet *et al.,* 1992 *Antisense Res. Dev.*, 2, 3-15; Dropulic *et al.,* 1992 *J. Virol,* 66, 1432-41; Weerasinghe *et al.,* 1991 *J. Virol,* **65**, 5531-4; Ojwang *et al.,* 1992 *Proc. Natl. Acad. Sci. USA* 89, 10802-6; Chen *et al.,* 1992 *Nucleic Acids Res.*, 20, 4581-9; Sarver *et al.,* 1990 *Science* 247, 1222-1225; Thompson *et al.,* 1995 *Nucleic Acids Res.* 23, 2259; Good *et al.,* 1997, *Gene* Therapy, 4, 45; all of the references are hereby incorporated in their totality by reference herein). Those skilled in the art realize that any nucleic acid can be expressed in eukaryotic cells from the appropriate

DNA/RNA vector. The activity of such nucleic acids can be augmented by their release from the primary transcript by an enzymatic nucleic acid (Draper *et al.,* PCT WO 93/23569, and Sullivan *et al.,* PCT WO 94/02595; Ohkawa *et al.,* 1992 *Nucleic Acids Symp. Ser.,* 27, 15-6; Taira *et al.,* 1991, *Nucleic Acids Res.,* 19, 5125-30; Ventura *et al.,* 1993 *Nucleic Acids Res.,* 21, 3249-55; Chowrira *et al.,* 1994 *J. Biol. Chem.* 269, 25856; all of the references are hereby incorporated in their totality by reference herein).

In another aspect of the invention, enzymatic nucleic acid molecules that cleave target molecules are expressed from transcription units (see for example Couture *et al.,* 1996, *TIG.,* 12, 510) inserted into DNA or RNA vectors. The recombinant vectors are preferably DNA plasmids or viral vectors. Enzymatic nucleic acid molecule expressing viral vectors could be constructed based on, but not limited to, adeno-associated virus, retrovirus, adenovirus, or alphavirus. Preferably, the recombinant vectors capable of expressing the nzymatic nucleic acid molecules are delivered as described above, and persist in target cells. Alternatively, viral vectors may be used that provide for transient expression of enzymatic nucleic acid molecules. Such vectors might be repeatedly administered as necessary. Once expressed, the enzymatic nucleic acid molecules cleave the target mRNA. The active enzymatic nucleic acid molecule contains an enzymatic center or core equivalent to those in the examples, and binding arms able to bind target nucleic acid molecules such that cleavage at the target site occurs. Other sequences may be present which do not interfere with such cleavage. Delivery of enzymatic nucleic acid molecule expressing vectors could be systemic, such as by intravenous or intramuscular administration, by administration to target cells ex-planted from the patient followed by reintroduction into the patient, or by any other means that would allow for introduction into the desired target cell (for a review see Couture *et al.,* 1996, *TIG.,* 12, 510).

In one aspect the invention features, an expression vector comprising nucleic acid sequence encoding at least one of the nucleic acid catalyst of the instant invention is disclosed. The nucleic acid sequence encoding the nucleic acid catalyst of the instant invention is operable linked in a manner that allows expression of that nucleic acid molecule.

In another aspect the invention features an expression vector comprising: a) a transcription initiation region (*e.g.,* eukaryotic pol I, II or III initiation region); b) a

transcription termination region (*e.g.,* eukaryotic pol I, II or III termination region); c) a nucleic acid sequence encoding at least one of the nucleic acid catalyst of the instant invention; and wherein said sequence is operably linked to said initiation region and said termination region, in a manner which allows expression and/or delivery of said nucleic acid molecule. The vector may optionally include an open reading frame (ORF) for a protein operably linked on the 5' side or the 3'-side of the sequence encoding the nucleic acid catalyst of the invention; and/or an intron (intervening sequences).

Transcription of the nucleic acid molecule sequences are driven from a promoter for eukaryotic RNA polymerase I (pol I), RNA polymerase II (pol II), or RNA polymerase III (pol III). Transcripts from pol II or pol III promoters will be expressed at high levels in all cells; the levels of a given pol II promoter in a given cell type will depend on the nature of the gene regulatory sequences (enhancers, silencers, etc.) present nearby. Prokaryotic RNA polymerase promoters are also used, providing that the prokaryotic RNA polymerase enzyme is expressed in the appropriate cells (Elroy-Stein and Moss, 1990, *Proc. Natl. Acad. Sci. U S A*, 87, 6743-7; Gao and Huang 1993, *Nucleic Acids Res..*, 21, 2867-72; Lieber et al., 1993, *Methods Enzymol.,* 217, 47-66; Zhou et al., 1990, *Mol. Cell. Biol.*, 10, 4529-37). All of these references are incorporated by reference herein. Several investigators have demonstrated that nucleic acid molecules, such as enzymatic nucleic acids expressed from such promoters can function in mammalian cells (e.g. Kashani-Sabet et al., 1992, *Antisense Res. Dev.,* 2, 3-15; Ojwang et al., 1992, *Proc. Natl. Acad. Sci. U S A*, 89, 10802-6; Chen *et al.*, 1992, *Nucleic Acids Res.*, 20, 4581-9; Yu et al., 1993, *Proc. Natl. Acad. Sci. U S A*, 90, 6340-4; L'Huillier *et al.*, 1992, *EMBO J.,* 11, 4411-8; Lisziewicz *et al.*, 1993, *Proc. Natl. Acad. Sci. U. S. A*, 90, 8000-4; Thompson *et al.,* 1995, *Nucleic Acids Res.,* 23, 2259; Sullenger & Cech, 1993, *Science,* 262, 1566). More specifically, transcription units such as the ones derived from genes encoding U6 small nuclear (snRNA), transfer RNA (tRNA) and adenovirus VA RNA are useful in generating high concentrations of desired RNA molecules such as enzymatic nucleic acids in cells (Thompson *et al., supra*; Couture and Stinchcomb, *1996, supra*; Noonberg *et al.,* 1994, *Nucleic Acid Res.*, 22, 2830; Noonberg *et al.,* US Patent No. 5,624,803; Good *et al.,* 1997, *Gene Ther.,* 4, 45; Beigelman *et al.,* International PCT Publication No. *WO 96/18736*; all of these publications are incorporated by reference herein. The above enzymatic nucleic acid molecule transcription units can be incorporated into a

variety of vectors for introduction into mammalian cells, including but not restricted to, plasmid DNA vectors, viral DNA vectors (such as adenovirus or adeno-associated virus vectors), or viral RNA vectors (such as retroviral or alphavirus vectors) (for a review see Couture and Stinchcomb, *1996, supra)*.

In yet another aspect the invention features an expression vector comprising nucleic acid sequence encoding at least one of the nucleic acid molecules of the invention, in a manner which allows expression of that nucleic acid molecule. The expression vector comprises in one embodiment; a) a transcription initiation region; b) a transcription termination region; c) a nucleic acid sequence encoding at least one said nucleic acid molecule; and wherein said sequence is operably linked to said initiation region and said termination region, in a manner which allows expression and/or delivery of said nucleic acid molecule. In another preferred embodiment the expression vector comprises: a) a transcription initiation region; b) a transcription termination region; c) an open reading frame; d) a nucleic acid sequence encoding at least one said nucleic acid molecule, wherein said sequence is operably linked to the 3'-end of said open reading frame; and wherein said sequence is operably linked to said initiation region, said open reading frame and said termination region, in a manner which allows expression and/or delivery of said nucleic acid molecule. In yet another embodiment the expression vector comprises: a) a transcription initiation region; b) a transcription termination region; c) an intron; d) a nucleic acid sequence encoding at least one said nucleic acid molecule; and wherein said sequence is operably linked to said initiation region, said intron and said termination region, in a manner which allows expression and/or delivery of said nucleic acid molecule. In another embodiment, the expression vector comprises: a) a transcription initiation region; b) a transcription termination region; c) an intron; d) an open reading frame; e) a nucleic acid sequence encoding at least one said nucleic acid molecule, wherein said sequence is operably linked to the 3'-end of said open reading frame; and wherein said sequence is operably linked to said initiation region, said intron, said open reading frame and said termination region, in a manner which allows expression and/or delivery of said nucleic acid molecule.

Interferons

Type I interferons (IFN) are a class of natural cytokines that includes a family of greater than 25 IFN-α (Pesta, 1986, *Methods Enzymol.* 119, 3-14) as well as IFN-β, and IFN-ω. Although evolutionarily derived from the same gene (Diaz *et al.*, 1994, *Genomics* 22, 540-552), there are many differences in the primary sequence of these molecules, implying an evolutionary divergence in biologic activity. All type I IFN share a common pattern of biologic effects that begin with binding of the IFN to the cell surface receptor (Pfeffer & Strulovici, 1992, Transmembrane secondary messengers for IFN-α/β. In: *Interferon. Principles and Medical Applications.*, S. Baron, D.H. Coopenhaver, F. Dianzani, W.R. Fleischmann Jr., T.K. Hughes Jr., G.R. Kimpel, D.W. Niesel, G.J. Stanton, and S.K. Tyring, eds. 151-160). Binding is followed by activation of tyrosine kinases, including the Janus tyrosine kinases and the STAT proteins, which leads to the production of several IFN-stimulated gene products (Johnson *et al.*, 1994, *Sci. Am.* 270, 68-75). The IFN-stimulated gene products are responsible for the pleotropic biologic effects of type I IFN, including antiviral, antiproliferative, and immunomodulatory effects, cytokine induction, and HLA class I and class II regulation (Pestka *et al.*, 1987, *Annu. Rev. Biochem* 56, 727). Examples of IFN-stimulated gene products include 2-5-oligoadenylate synthetase (2-5 OAS), β_2-microglobulin, neopterin, p68 kinases, and the Mx protein (Chebath & Revel, 1992, The 2-5 A system: 2-5 A synthetase, isospecies and functions. In: *Interferon. Principles and Medical Applications.* S. Baron, D.H. Coopenhaver, F. Dianzani, W.R. Jr. Fleischmann, T.K. Jr Hughes, G.R. Kimpel, D.W. Niesel, G.J. Stanton, and S.K. Tyring, eds., pp. 225-236; Samuel, 1992, The RNA-dependent P1/eIF-2α protein kinase. In: *Interferon. Principles and Medical Applications.* S. Baron, D.H. Coopenhaver, F. Dianzani, W.R. Fleischmann Jr., T.K. Hughes Jr., G.R. Kimpel, D.W. Niesel, G.H. Stanton, and S.K. Tyring, eds. 237-250; Horisberger, 1992, MX protein: function and Mechanism of Action. In: *Interferon. Principles and Medical Applications.* S. Baron, D.H. Coopenhaver, F. Dianzani, W.R. Fleischmann Jr., T.K. Hughes Jr., G.R. Kimpel, D.W. Niesel, G.H. Stanton, and S.K. Tyring, eds. 215-224). Although all type I IFN have similar biologic effects, not all the activities are shared by each type I IFN, and, in many cases, the extent of activity varies quite substantially for each IFN subtype (Fish *et al*, 1989, *J. Interferon Res.* 9, 97-114; Ozes *et al.*, 1992, *J. Interferon Res.* 12, 55-59). More specifically, investigations into the properties of different subtypes of IFN-α and molecular hybrids of IFN-α have shown differences in pharmacologic properties (Rubinstein, 1987, *J. Interferon*

Res. 7, 545-551). These pharmacologic differences may arise from as few as three amino acid residue changes (Lee *et al.*, 1982, *Cancer Res.* 42, 1312-1316).

Eighty-five to 166 amino acids are conserved in the known IFN-α subtypes. Excluding the IFN-α pseudogenes, there are approximately 25 known distinct IFN-α subtypes. Pairwise comparisons of these nonallelic subtypes show primary sequence differences ranging from 2% to 23%. In addition to the naturally occurring IFNs, a non-natural recombinant type I interferon known as consensus interferon (CIFN) has been synthesized as a therapeutic compound (Tong *et al.*, 1997, *Hepatology* 26, 747-754).

Interferon is currently in use for at least 12 different indications including infectious and autoimmune diseases and cancer (Borden, 1992, *N. Engl. J. Med.* 326, 1491-1492). For autoimmune diseases IFN has been utilized for treatment of rheumatoid arthritis, multiple sclerosis, and Crohn's disease. For treatment of cancer IFN has been used alone or in combination with a number of different compounds. Specific types of cancers for which IFN has been used include squamous cell carcinomas, melanomas, hypernephromas, hemangiomas, hairy cell leukemia, and Kaposi's sarcoma. In the treatment of infectious diseases, IFNs increase the phagocytic activity of macrophages and cytotoxicity of lymphocytes and inhibits the propagation of cellular pathogens. Specific indications for which IFN has been used as treatment include: hepatitis B, human papillomavirus types 6 and 11 (i.e. genital warts) (Leventhal *et al.*, 1991, *N Engl J Med* 325, 613-617), chronic granulomatous disease, and hepatitis C virus.

Numerous well controlled clinical trials using IFN-alpha in the treatment of chronic HCV infection have demonstrated that treatment three times a week results in lowering of serum ALT values in approximately 50% (range 40% to 70%) of patients by the end of 6 months of therapy (Davis *et al.*, 1989, The new England Journal of Medicine 321, 1501-1506; Marcellin et al., 1991, *Hepatology* 13, 393-397; Tong *et al.*, 1997, Hepatology 26, 747-754; Tong et al., *Hepatology* 26, 1640-1645). However, following cessation of interferon treatment, approximately 50% of the responding patients relapsed, resulting in a "durable" response rate as assessed by normalization of serum ALT concentrations of approximately 20 to 25%. In addition, studies that have examined six months of type 1 interferon therapy using changes in HCV RNA values as a clinical endpoint have demonstrated that up to 35% of patients will have a loss of HCV RNA by the end of therapy (Tong *et al.*, 1997, supra).

However, as with the ALT endpoint, about 50% of the patients relapse six months following cessation of therapy resulting in a durable virologic response of only 12% (23). Studies that have examined 48 weeks of therapy have demonstrated that the sustained virological response is up to 25%.

Pegylated interferons, ie. interferons conjugated with polyethylene glycol (PEG), have demonstrated improved characteristics over interferon. Advantages incurred by PEG conjugation can include an improved pharmacokinetic profile compared to interferons lacking PEG, thus imparting more convenient dosing regimes, improved tolerance, and improved antiviral efficacy. Such improvements have been demonstrated in clinical studies of both polyethylene glycol interferon alfa-2a (PEGASYS, Roche) and polyethylene glycol interferon alfa-2b (VIRAFERON PEG, PEG-INTRON, Enzon/Schering Plough).

Enzymatic nucleic acid molecules in combination with interferons and polyethylene glycol interferons have the potential to improve the effectiveness of treatment of HCV or any of the other indications discussed above. Enzymatic nucleic acid molecules targeting RNAs associated with diseases such as infectious diseases, autoimmune diseases, and cancer, can be used individually or in combination with other therapies such as interferons and polyethylene glycol interferons and to achieve enhanced efficacy.

Examples

The following are non-limiting examples showing the selection, isolation, synthesis and activity of enzymatic nucleic acids of the instant invention.

The following examples demonstrate the use of enzymatic nucleic acid molecules that cleave HCV RNA. The methods described herein represent a scheme by which nucleic acid molecules can be derived that cleave other RNA targets required for HCV replication.

Example 1: Identification of Potential Enzymatic nucleic acid molecules Cleavage Sites in HCV RNA

The sequence of HCV RNA was screened for accessible sites using a computer folding algorithm. Regions of the mRNA that did not form secondary folding structures and

contained potential hammerhead and/or hairpin enzymatic nucleic acid cleavage sites were identified. The sequences of these cleavage sites are shown in **Tables III-V.**

Example 2: Selection of Enzymatic nucleic acid molecules Cleavage Sites in HCV RNA

Enzymatic nucleic acid target sites were chosen by analyzing sequences of Human HCV (Genbank accession Nos: D11168 , D50483.1, L38318 and S82227) and prioritizing the sites on the basis of folding. Enzymatic nucleic acid molecules are designed that could bind each target and are individually analyzed by computer folding (Christoffersen *et al.,* 1994 *J. Mol. Struc. Theochem,* 311, 273; Jaeger *et al.*, 1989, *Proc. Natl. Acad. Sci. USA*, 86, 7706) to assess whether the enzymatic nucleic acid molecules sequences fold into the appropriate secondary structure. Those enzymatic nucleic acid molecules with unfavorable intramolecular interactions between the binding arms and the catalytic core can be eliminated from consideration. As noted below, varying binding arm lengths can be chosen to optimize activity. Generally, at least 4 bases on each arm are able to bind to, or otherwise interact with, the target RNA.

Example 3: Chemical Synthesis and Purification of Enzymatic nucleic acids

Enzymatic nucleic acid molecules can be designed to anneal to various sites in the RNA message. The binding arms of the enzymatic nucleic acid molecules are complementary to the target site sequences described above. The enzymatic nucleic acid molecules can be chemically synthesized using, for example, RNA syntheses such as those described above and those described in Usman et al., (1987 J. Am. Chem. Soc., 109, 7845), Scaringe et al., (1990 Nucleic Acids Res., 18, 5433) and Wincott et al., supra. Such methods make use of common nucleic acid protecting and coupling groups, such as dimethoxytrityl at the 5'-end, and phosphoramidites at the 3'-end. The average stepwise coupling yields are typically >98%. Enzymatic nucleic acid molecules can be modified to enhance stability by modification with nuclease resistant groups, for example, 2'-amino, 2'-C-allyl, 2'-flouro, 2'-O-methyl, 2'-H (for a review see Usman and Cedergren, 1992 TIBS 17, 34).

Enzymatic nucleic acid molecules can also be synthesized from DNA templates using bacteriophage T7 RNA polymerase (Milligan and Uhlenbeck, 1989, Methods Enzymol. 180, 51). Enzymatic nucleic acid molecules can be purified by gel electrophoresis using known methods, or can be purified by high pressure liquid chromatography (HPLC; See Wincott et al., supra; the totality of which is hereby incorporated herein by reference), and are

resuspended in water. The sequences of chemically synthesized enzymatic nucleic acid constructs are shown below in **Tables V and VI.** The antisense nucleic acid molecules shown in **Table VII** were chemically synthesized.

Inactive enzymatic nucleic acid molecules, for example inactive hammerhead enzymatic nucleic acids, can be synthesized by substituting the order of G5A6 and substituting a U for A14 (numbering from Hertel et al., 1992 Nucleic Acids Res., 20, 3252).

Example 4: Enzymatic Nucleic Acid Cleavage of HCV RNA Target *in vitro*

Enzymatic nucleic acid molecules targeted to the HCV are designed and synthesized as described above. These enzymatic nucleic acid molecules can be tested for cleavage activity *in vitro*, for example using the following procedure. The target sequences and the nucleotide location within the HCV are given in **Table V**.

Cleavage Reactions: Full-length or partially full-length, internally-labeled target RNA for enzymatic nucleic acid molecule cleavage assay is prepared by *in vitro* transcription in the presence of [α-^{32}P] CTP, passed over a G 50 Sephadex column by spin chromatography and used as substrate RNA without further purification. Alternately, substrates are 5'-^{32}P-end labeled using T4 polynucleotide kinase enzyme. Assays are performed by pre-warming a 2X concentration of purified enzymatic nucleic acid molecule in enzymatic nucleic acid molecule cleavage buffer (50 mM Tris-HCl, pH 7.5 at 37°C, 10 mM $MgCl_2$) and the cleavage reaction was initiated by adding the 2X enzymatic nucleic acid molecule mix to an equal volume of substrate RNA (maximum of 1-5 nM) that was also pre-warmed in cleavage buffer. As an initial screen, assays are carried out for 1 hour at 37°C using a final concentration of either 40 nM or 1 mM enzymatic nucleic acid molecule, *i.e.,* enzymatic nucleic acid molecule excess. The reaction is quenched by the addition of an equal volume of 95% formamide, 20 mM EDTA, 0.05% bromophenol blue and 0.05% xylene cyanol after which the sample is heated to 95°C for 2 minutes, quick chilled and loaded onto a denaturing polyacrylamide gel. Substrate RNA and the specific RNA cleavage products generated by enzymatic nucleic acid molecule cleavage are visualized on an autoradiograph of the gel. The percentage of cleavage is determined by Phosphor Imager® quantitation of bands representing the intact substrate and the cleavage products.

Alternatively, enzymatic nucleic acid molecules and substrates were synthesized in 96-well format using 0.2μmol scale. Substrates were 5'-^{32}P labeled and gel purified using 7.5% polyacrylamide gels, and eluting into water. Assays were done by combining trace substrate with 500nM enzymatic nucleic acid or greater, and initiated by adding final concentrations of 40mM Mg^{+2}, and 50mM Tris-Cl pH 8.0. For each enzymatic nucleic acid/substrate combination a control reaction was done to ensure cleavage was not the result of non-specific substrate degradation. A single three hour time point was taken and run on a 15% polyacrylamide gel to asses cleavage activity. Gels were dried and scanned using a Molecular Dynamics Phosphorimager and quantified using Molecular Dynamics ImageQuant software. Percent cleaved was determined by dividing values for cleaved substrate bands by full-length (uncleaved) values plus cleaved values and multiplying by 100 (%cleaved=[C/(U+C)]*100). In vitro cleavage data of enzymatic nucleic acid molecules targeting plus and minus strand HCV RNA is shown in **Table VIII**.

Example 5: Inhibition of Luciferase Activity Using HCV Targeting Enzymatic nucleic acids in OST7 Cells

The capability of enzymatic nucleic acids to inhibit HCV RNA intracellularly was tested using a dual reporter system that utilizes both firefly and Renilla luciferase (**Figure 6**). The enzymatic nucleic acids targeted to the 5' HCV UTR region, which when cleaved, would prevent the translation of the transcript into luciferase.

Synthesis of Stabilized Enzymatic nucleic acids

Enzymatic nucleic acids were designed to target 15 sites within the 5'UTR of the HCV RNA (**Figure 7**) and synthesized as previously described, except that all enzymatic nucleic acids contain two 2'-amino uridines. All enzymatic nucleic acid and paired control sequences for targeted sites used in various examples herein are shown in **Table VI**.

Reporter plasmids

The T7/HCV/firefly luciferase plasmid (HCVT7$C_{1\text{-}341}$, genotype 1a) was graciously provided by Aleem Siddiqui (University of Colorado Health Sciences Center, Denver, CO). The T7/HCV/firefly luciferase plasmid contains a T7 bacteriophage promoter upstream of the

HCV 5'UTR (nucleotides 1-341)/firefly luciferase fusion DNA. The Renilla luciferase control plasmid (pRLSV40) was purchased from PROMEGA.

Luciferase assay

Dual luciferase assays were carried out according to the manufacturer's instructions (PROMEGA) at 4 hours after co-transfection of reporter plasmids and enzymatic nucleic acids. All data is shown as the average ratio of HCV/firefly luciferase luminescence over Renilla luciferase luminescence as determined by triplicate samples $\pm$ SD.

Cell culture and transfections

OST7 cells were maintained in Dulbecco's modified Eagle's medium (GIBCO BRL) supplemented with 10% fetal calf serum, L-glutamine (2 mM) and penicillin/streptomycin. For transfections, OST7 cells were seeded in black-walled 96-well plates (Packard) at a density of 12,500 cells/well and incubated at 37°Cunder 5% CO_2 for 24 hours. Co-transfection of target reporter HCVT7C (0.8 μg/mL), control reporter pRLSV40, (1.2 μg/mL) and enzymatic nucleic acid, (50 - 200 nM) was achieved by the following method: a 5X mixture of HCVT7C (4 μg/mL), pRLSV40 (6 μg/mL) enzymatic nucleic acid (250 – 1000 nM) and cationic lipid (28.5 μg/mL) was made in 150 μL of OPTI-MEM (GIBCO BRL) minus serum. Reporter/enzymatic nucleic acid/lipid complexes were allowed to form for 20 min at 37°Cunder 5% CO_2. Medium was aspirated from OST7 cells and replaced with 120 μL of OPTI-MEM (GIBCO BRL) minus serum, immediately followed by the addition of 30 μL of 5X reporter/enzymatic nucleic acid/lipid complexes. Cells were incubated with complexes for 4 hours at 37°Cunder 5% CO_2.

IC50 determinations for dose response curves

Apparent IC_{50} values were calculated by linear interpolation. The apparent IC_{50} is 1/2 the maximal response between the two consecutive points in which approximately 50% inhibition of HCV/luciferase expression is observed on the dose curve.

Quantitation of RNA Samples

Total RNA from transfected cells was purified using the Qiagen RNeasy 96 procedure including a DNase I treatment according to the manufacturer's instructions. Real time RT-PCR (Taqman assay) was performed on purified RNA samples using separate primer/probe sets specific for either firefly or Renilla luciferase RNA. Firefly luciferase primers and probe were upper (5'-CGGTCGGTAAAGTTGTTCCATT-3'), lower (5'-CCTCTGACACATAATTCGCCTCT-3'), and probe (5'-FAM-TGAAGCGAAGGTTGTGGATCTGGATACC-TAMRA-3'), and Renilla luciferase primers and probe were upper (5'-GTTTATTGAATCGGACCCAGGAT-3'), lower (5'-AGGTGCATCTTCTTGCGAAAA-3'), and probe (5'-FAM-CTTTTCCAATGCTATTGTTGAAGGTGCCAA-TAMRA-3'), both sets of primers and probes were purchased from Integrated DNA Technologies. RNA levels were determined from a standard curve of amplified RNA purified from a large-scale transfection. RT minus controls established that RNA signals were generated from RNA and not residual plasmid DNA. RT-PCR conditions were: 30 min at 48°C, 10 min at 95°C, followed by 40 cycles of 15 sec at 95°C and 1 min at 60°C. Reactions were performed on an ABI Prism 7700 sequence detector. Levels of firefly luciferase RNA were normalized to the level of Renilla luciferase RNA present in the same sample. Results are shown as the average of triplicate treatments ± SD.

Example 6: Inhibition of HCV 5'UTR-luciferase expression by synthetic stabilized enzymatic nucleic acids

The primary sequence of the HCV 5'UTR and characteristic secondary structure (**Figure 7**) is highly conserved across all HCV genotypes, thus making it a very attractive target for enzymatic nucleic acid-mediated cleavage. Enzymatic hammerhead nucleic acids, as a generally shown in **Figure 8** and **Table VI** (RPI 12249-12254, 12257-12265) were designed and synthesized to target 15 of the most highly conserved sites in the 5'UTR of HCV RNA. These synthetic enzymatic nucleic acids were stabilized against nuclease degradation by the addition of modifications such as 2'-*O*-methyl nucleotides, 2'-amino-uridines at U4 and U7 core positions, phosphorothioate linkages, and a 3'-inverted abasic cap.

In order to mimic cytoplasmic transcription of the HCV genome, OST7 cells were transfected with a target reporter plasmid containing a T7 bacteriophage promoter upstream of

a HCV 5'UTR/firefly luciferase fusion gene. Cytoplasmic expression of the target reporter is facilitated by high levels of T7 polymerase expressed in the cytoplasm of OST7 cells. Co-transfection of target reporter $HCVT7C_{1-341}$ (firefly luciferase), control reporter pRLSV40 (Renilla luciferase) and enzymatic nucleic acid was carried out in the presence of cationic lipid. To determine the background level of luciferase activity, applicant used a control enzymatic nucleic acid that targets an irrelevant, non-HCV sequence. Transfection of reporter plasmids in the presence of this irrelevant control enzymatic nucleic acid (ICR) resulted in a slight decrease of reporter expression when compared to transfection of reporter plasmids alone. Therefore, the ICR was used to control for non-specific effects on reporter expression during treatment with HCV specific enzymatic nucleic acids. Renilla luciferase expression from the pRLSV40 reporter was used to normalize for transfection efficiency and sample recovery.

Of the 15 amino-modified hammerhead enzymatic nucleic acids tested, 12 significantly inhibited HCV/luciferase expression (> 45%, $P < 0.05$) as compared to the ICR (**Figure 9A**). These data suggest that most of the HCV 5'UTR sites targeted here are accessible to enzymatic nucleic acid binding and subsequent RNA cleavage. To investigate further the enzymatic nucleic acid-dependent inhibition of HCV/luciferase activity, hammerhead enzymatic nucleic acids designed to cleave after sites 79, 81, 142, 192, 195, 282 or 330 of the HCV 5'UTR were selected for continued study because their anti-HCV activity was the most efficacious over several experiments. A corresponding attenuated core (AC) control was synthesized for each of the 7 active enzymatic nucleic acids (**Table VI**). Each paired AC control contains similar nucleotide composition to that of its corresponding active enzymatic nucleic acid however, due to scrambled binding arms and changes to the catalytic core, lacks the ability to bind or catalyze the cleavage of HCV RNA. Treatment of OST7 cells with enzymatic nucleic acids designed to cleave after sites 79, 81, 142, 195 or 330 resulted in significant inhibition of HCV/luciferase expression (65%, 50%, 50%, 80% and 80%, respectively) when compared to HCV/luciferase expression in cells treated with corresponding ACs, $P < 0.05$ (**Figure 9B**). It should be noted that treatment with either the ICR or ACs for sites 79, 81, 142 or 192 caused a greater reduction of HCV/luciferase expression than treatment with ACs for sites 195, 282 or 330. The observed differences in HCV/luciferase expression after treatment with ACs most likely represents the range of

activity due to non-specific effects of oligonucleotide treatment and/or differences in base composition. Regardless of differences in HCV/luciferase expression levels observed as a result of treatment with ACs, active enzymatic nucleic acids designed to cleave after sites 79, 81, 142, 195, or 330 demonstrated similar and potent anti-HCV activity (**Figure 9B**).

Example 7: Synthetic stabilized enzymatic nucleic acids inhibit HCV/luciferase expression in a concentration-dependent manner

In order to characterize enzymatic nucleic acid efficacy in greater detail, these same 5 lead hammerhead enzymatic nucleic acids were tested for their ability to inhibit HCV/luciferase expression over a range of enzymatic nucleic acid concentrations (0 nM - 100 nM). For constant transfection conditions, the total concentration of nucleic acid was maintained at 100 nM for all samples by mixing the active enzymatic nucleic acid with its corresponding AC. Moreover, mixing of active enzymatic nucleic acid and AC maintains the lipid to nucleic acid charge ratio. A concentration-dependent inhibition of HCV/luciferase expression was observed after treatment with each of the 5 enzymatic nucleic acids (**Figures 10A-E**). By linear interpolation, the enzymatic nucleic acid concentration resulting in 50% inhibition (apparent IC_{50}) of HCV/luciferase expression ranged from 40 - 215 nM. The two most efficacious enzymatic nucleic acids were those designed to cleave after sites 195 or 330 with apparent IC_{50} values of 46 nM and 40 nM, respectively (**Figures 10D and E**).

Example 8: An enzymatic nucleic acid mechanism is required for the observed inhibition of HCV/luciferase expression

To confirm that an enzymatic nucleic acid mechanism of action was responsible for the observed inhibition of HCV/luciferase expression, paired binding-arm attenuated core (BAC) controls (RPI 15291 and 15294) were synthesized for direct comparison to enzymatic nucleic acids targeting sites 195 (RPI 12252) and 330 (RPI 12254). Paired BACs can specifically bind HCV RNA but are unable to promote RNA cleavage because of changes in the catalytic core and, thus, can be used to assess inhibition due to binding alone. Also included in this comparison were paired SAC controls (RPI 15292 and 15295) that contain scrambled binding arms and attenuated catalytic cores, and so lack the ability to bind the target RNA or to catalyze target RNA cleavage.

Enzymatic nucleic acid cleavage of target RNA should result in both a lower level of HCV/luciferase RNA and a subsequent decrease in HCV/luciferase expression. In order to analyze target RNA levels, a reverse transcriptase/polymerase chain reaction (RT-PCR) assay was employed to quantify HCV/luciferase RNA levels. Primers were designed to amplify the luciferase coding region of the HCV 5'UTR/luciferase RNA. This region was chosen because HCV-targeted enzymatic nucleic acids that might co-purify with cellular RNA would not interfere with RT-PCR amplification of the luciferase RNA region. Primers were also designed to amplify the Renilla luciferase RNA so that Renilla RNA levels could be used to control for transfection efficiency and sample recovery.

OST7 cells were treated with active enzymatic nucleic acids designed to cleave after sites 195 or 330, paired SACs, or paired BACs. Treatment with enzymatic nucleic acids targeting site 195 or 330 resulted in a significant reduction of HCV/luciferase RNA when compared to their paired SAC controls ($P < 0.01$). In this experiment the site 195 enzymatic nucleic acid was more efficacious than the site 330 enzymatic nucleic acid (**Figure 11A**). Treatment with paired BACs that target site 195 or 330 did not reduce HCV/luciferase RNA when compared to the corresponding SACs, thus confirming that the ability to bind alone does not result in a reduction of HCV/luciferase RNA.

To confirm that enzymatic nucleic acid-mediated cleavage of target RNA is necessary for inhibition of HCV/luciferase expression, HCV/luciferase activity was determined in the same experiment. As expected, significant inhibition of HCV/luciferase expression was observed after treatment with active enzymatic nucleic acids when compared to paired SACs (**Figure 11B**). Importantly, treatment with paired BACs did not inhibit HCV/luciferase expression, thus confirming that the ability to bind alone is also not sufficient to inhibit translation. As observed in the RNA assay, the site 195 enzymatic nucleic acid was more efficacious than the site 330 enzymatic nucleic acid in this experiment. However, a correlation between enzymatic nucleic acid-mediated HCV RNA reduction and inhibition of HCV/luciferase translation was observed for enzymatic nucleic acids to both sites. The reduction in target RNA and the necessity for an active enzymatic nucleic acid catalytic core confirm that a enzymatic nucleic acid mechanism is required for the observed reduction in HCV/luciferase protein activity in cells treated with site 195 or site 330 enzymatic nucleic acids.

Example 9: Zinzyme Inhibition of chimeric HCV/Poliovirus replication

During HCV infection, viral RNA is present as a potential target for enzymatic nucleic acid cleavage at several processes: un-coating, translation, RNA replication and packaging. Target RNA may be more or less accessible to enzymatic nucleic acid cleavage at any one of these steps. Although the association between the HCV initial ribosome entry site (IRES) and the translation apparatus is mimicked in the HCV 5'UTR/luciferase reporter system, these other viral processes are not represented in the OST7 system. The resulting RNA/protein complexes associated with the target viral RNA are also absent. Moreover, these processes may be coupled in an HCV-infected cell which could further impact target RNA accessibility. Therefore, applicant tested whether enzymatic nucleic acids designed to cleave the HCV 5'UTR could effect a replicating viral system.

Recently, Lu and Wimmer characterized a HCV-poliovirus chimera in which the poliovirus IRES was replaced by the IRES from HCV (Lu & Wimmer, 1996, Proc. Natl. Acad. Sci. USA. 93, 1412-1417). Poliovirus (PV) is a positive strand RNA virus like HCV, but unlike HCV is non-enveloped and replicates efficiently in cell culture. The HCV-PV chimera expresses a stable, small plaque phenotype relative to wild type PV.

The following enzymatic nucleic acid molecules (zinzymes) were synthesized and tested for replicative inhibition of an HCV/Poliovirus chimera: RPI 18763, RPI 18812, RPI 18749, RPI 18765, RPI 18792, and RPI 18814 (**Table V**). A scrambled attenuated core enzymatic nucleic acid, RPI 18743, was used as a control.

HeLa cells were infected with the HCV-PV chimera for 30 minutes and immediately treated with enzymatic nucleic acid. HeLa cells were seeded in U-bottom 96-well plates at a density of 9000-10,000 cells/well and incubated at 37°C under 5% CO2 for 24 h. Transfection of nucleic acid (200 nM) was achieved by mixing of 10X nucleic acid (2000 nM) and 10X of a cationic lipid (80 μg/ml) in DMEM (Gibco BRL) with 5% fetal bovine serum (FBS). Nucleic acid/lipid complexes were allowed to incubate for 15 minutes at 37°C under 5% CO2. Medium was aspirated from cells and replaced with 80 μl of DMEM (Gibco BRL) with 5% FBS serum, followed by the addition of 20 μls of 10X complexes. Cells were incubated with complexes for 24 hours at 37°C under 5% CO2 .

The yield of HCV-PV from treated cells was quantified by plaque assay. The plaque assays were performed by diluting virus samples in serum-free DMEM (Gibco BRL) and applying 100 µl to HeLa cell monolayers (~80% confluent) in 6-well plates for 30 minutes. Infected monolayers were overlayed with 3 ml 1.2% agar (Sigma) and incubated at 37°C under 5% CO2. Two or three days later the overlay was removed, monolayers were stained with 1.2% crystal violet, and plaque forming units were counted. The results for the zinzyme inhibition of HCV-PV replication are shown in **Figure 16**.

Example 10: Antisense inhibition of chimeric HCV/Poliovirus replication

Antisense nucleic acid molecules (RPI 17501 and RPI 17498, **Table VII**) were tested for replicative inhibition of an HCV/Poliovirus chimera compared to scrambled controls. An antisense nucleic acid molecule is a non-enzymatic nucleic acid molecule that binds to target RNA by means of RNA-RNA or RNA-DNA or RNA-PNA (protein nucleic acid; Egholm *et al.,* 1993 *Nature* 365, 566) interactions and alters the activity of the target RNA (for a review, see Stein and Cheng, 1993 *Science* 261, 1004 and Woolf *et al.,* US patent No. 5,849,902). Typically, antisense molecules are complementary to a target sequence along a single contiguous sequence of the antisense molecule. However, in certain embodiments, an antisense molecule may bind to substrate such that the substrate molecule forms a loop, and/or an antisense molecule may bind such that the antisense molecule forms a loop. Thus, the antisense molecule may be complementary to two (or even more) non-contiguous substrate sequences or two (or even more) non-contiguous sequence portions of an antisense molecule may be complementary to a target sequence or both. For a review of current antisense strategies, see Schmajuk *et al.,* 1999, *J. Biol. Chem.,* 274, 21783-21789, Delihas *et al.,* 1997, *Nature,* 15, 751-753, Stein *et al.,* 1997, *Antisense N. A. Drug Dev.,* 7, 151, Crooke, 2000, *Methods Enzymol.,* 313, 3-45; Crooke, 1998, *Biotech. Genet. Eng. Rev.,* 15, 121-157, Crooke, 1997, *Ad. Pharmacol.,* 40, 1-49. In addition, antisense DNA can be used to target RNA by means of DNA-RNA interactions, thereby activating RNase H, which digests the target RNA in the duplex. The antisense oligonucleotides can comprise one or more RNAse H activating region, which is capable of activating RNAse H cleavage of a target RNA. Antisense DNA can be synthesized chemically or expressed via the use of a single stranded DNA expression vector or equivalent thereof. Additionally, antisense molecules can be used in combination with the enzymatic nucleic acid molecules of the instant invention.

A "RNase H activating region" is a region (generally greater than or equal to 4-25 nucleotides in length, preferably from 5-11 nucleotides in length) of a nucleic acid molecule

capable of binding to a target RNA to form a non-covalent complex that is recognized by cellular RNase H enzyme (see for example Arrow *et al.,* US 5,849,902; Arrow *et al.,* US 5,989,912). The RNase H enzyme binds to the nucleic acid molecule-target RNA complex and cleaves the target RNA sequence. The RNase H activating region comprises, for example, phosphodiester, phosphorothioate (preferably at least four of the nucleotides are phosphorothiote substitutions; more specifically, 4-11 of the nucleotides are phosphorothiote substitutions); phosphorodithioate, 5'-thiophosphate, or methylphosphonate backbone chemistry or a combination thereof. In addition to one or more backbone chemistries described above, the RNase H activating region can also comprise a variety of sugar chemistries. For example, the RNase H activating region can comprise deoxyribose, arabino, fluoroarabino or a combination thereof, nucleotide sugar chemistry. Those skilled in the art will recognize that the foregoing are non-limiting examples and that any combination of phosphate, sugar and base chemistry of a nucleic acid that supports the activity of RNase H enzyme is within the scope of the definition of the RNase H activating region and the instant invention.

HeLa cells were infected with the HCV-PV chimera for 30 minutes and immediately treated with antisense nucleic acid. HeLa cells were seeded in U-bottom 96-well plates at a density of 9000-10,000 cells/well and incubated at 37°C under 5% CO2 for 24 h. Transfection of nucleic acid (200 nM) was achieved by mixing of 10X nucleic acid (2000 nM) and 10X of a cationic lipid (80 µg/ml) in DMEM (Gibco BRL) with 5% fetal bovine serum (FBS). Nucleic acid/lipid complexes were allowed to incubate for 15 minutes at 37°C under 5% CO2. Medium was aspirated from cells and replaced with 80 µl of DMEM (Gibco BRL) with 5% FBS serum, followed by the addition of 20 µls of 10X complexes. Cells were incubated with complexes for 24 hours at 37°C under 5% CO2 .

The yield of HCV-PV from treated cells was quantified by plaque assay. The plaque assays were performed by diluting virus samples in serum-free DMEM (Gibco BRL) and applying 100 µl to HeLa cell monolayers (~80% confluent) in 6-well plates for 30 minutes. Infected monolayers were overlayed with 3 ml 1.2% agar (Sigma) and incubated at 37°C under 5% CO2. Two or three days later the overlay was removed, monolayers were stained with 1.2% crystal violet, and plaque forming units were counted. The results for the antisense inhibition of HCV-PV are shown in **Figure 17.**

Example 11: Nucleic acid Inhibition of Chimeric HCV/PV in combination with Interferon

One of the limiting factors in interferon (IFN) therapy for chronic HCV are the toxic side effects associated with IFN. Applicant has reasoned that lowering the dose of IFN needed may reduce these side effects. Applicant has previously shown that enzymatic nucleic acid molecules targeting HCV RNA have a potent antiviral effect against replication of an HCV-poliovirus (PV) chimera (Macejak *et al.,* 2000, *Hepatology,* 31, 769-776). In order to determine if the antiviral effect of type 1 IFN could be improved by the addition of anti-HCV enzymatic nucleic acid treatment, a dose response (0 U/ml to 100 U/ml) with IFN alfa 2a or IFN alfa 2b was performed in HeLa cells in combination with 200 nM site 195 anti-HCV enzymatic nucleic acid (RPI 13919) or enzymatic nucleic acid control (SAC) treatment. The SAC control (RPI 17894) is a scrambled binding arm, attenuated core version of the site 195 enzymatic nucleic acid (RPI 13919). IFN dose responses were performed with different pretreatment regimes to find the dynamic range of inhibition in this system. In these studies, HeLa cells were used instead of HepG2 because of more efficient enzymatic nucleic acid delivery (Macejak *et al.,* 2000, *Hepatology,* 31, 769-776).

Cells and Virus

HeLa cells were maintained in DMEM (BioWhittaker, Walkersville, MD) supplemented with 5% fetal bovine serum. A cloned DNA copy of the HCV-PV chimeric virus was a gift of Dr. Eckard Wimmer (NYU, Stony Brook, NY). An RNA version was generated by in vitro transcription and transfected into HeLa cells to produce infectious virus (Lu and Wimmer, 1996, PNAS USA., 93, 1412-1417).

Enzymatic nucleic acid Synthesis

Nuclease resistant enzymatic nucleic acids and control oligonucleotides containing 2'-O-methyl-nucleotides, 2'-deoxy-2'-C-allyl uridine, a 3'-inverted abasic cap, and phosphorothioate linkages were chemically synthesized. The anti-HCV enzymatic nucleic acid (RPI 13919) targeting cleavage after nucleotide 195 of the 5' UTR of HCV is shown in **Table V**. Attenuated core controls have nucleotide changes in the core sequence that greatly diminished the enzymatic nucleic acid's cleavage activity. The attenuated controls either contain scrambled binding arms (referred to as SAC, RPI 18743) or maintain binding arms (BAC, RPI 17894) capable of binding to the HCV RNA target.

Enzymatic nucleic acid Delivery

A cationic lipid was used as a cytofectin agent. HeLa cells were seeded in 96-well plates at a density of 9000-10,000 cells/well and incubated at 37°Cunder 5% CO2 for 24 h. Transfection of enzymatic nucleic acid or control oligonucleotides (200 nM) was achieved by mixing 10X enzymatic nucleic acid or control oligonucleotides (2000 nM) with 10X RPI.9778 (80 μg/ml) in DMEM containing 5% fetal bovine serum (FBS) in U-bottom 96-well plates to make 5X complexes. Enzymatic nucleic acid/lipid complexes were allowed to incubate for 15 min at 37°C under 5% CO2. Medium was aspirated from cells and replaced with 80 μl of DMEM (Gibco BRL) containing 5% FBS serum, followed by the addition of 20 μl of 5X complexes. Cells were incubated with complexes for 24 h at 37°Cunder 5% CO2.

Interferon/Enzymatic nucleic acid Combination Treatment

Interferon alfa 2a (Roferon®) was purchased from Roche Bioscience (Palo Alto, CA). Interferon alfa 2b (Intron A®) was purchased from Schering-Plough Corporation (Madison, NJ). Consensus interferon (interferon-alfa-con 1) was a generous gift of Amgen, Inc. (Thousand Oaks, CA). For the basis of comparison, the manufacturers' specified units were used in the studies reported here; however, the manufacturers' unit definitions of these three IFN preparations are not necessarily the same. Nevertheless, since clinical dosing is based on the manufacturers' specified units, a direct comparison based on these units has relevance to clinical therapeutic indices. HeLa cells were seeded (10,000 cells per well) and incubated at 37°Cunder 5% CO2 for 24 h. Cells were then pre-treated with interferon in complete media (DMEM + 5% FBS) for 4 h and then infected with HCV-PV at a multiplicity of infection (MOI) = 0.1 for 30 min. The viral inoculum was then removed and enzymatic nucleic acid or attenuated control (SAC or BAC) was delivered with the cytofectin formulation (8 μg/ml) in complete media for 24 h as described above. Where indicated for enzymatic nucleic acid dose response studies, active enzymatic nucleic acid was mixed with SAC to maintain a 200 nM total oligonucleotide concentration and the same lipid charge ratio. After 24 h, cells were lysed to release virus by three cycles of freeze/thaw. Virus was quantified by plaque assay and viral yield is reported as mean plaque forming units per ml (pfu/ml) + SD. All experiments

were repeated at least twice and the trends in the results reported were reproducible. Significance levels (P values) were determined by the Student's test.

Plaque Assay

Virus samples were diluted in serum-free DMEM and 100 µl applied to Vero cell monolayers (~80% confluent) in 6-well plates for 30 min. Infected monolayers were overlaid with 3 ml 1.2% agar (Sigma Chemical Company, St. Louis, MO) and incubated at 37°Cunder 5% CO2. When plaques were visible (after two to three days) the overlay was removed, monolayers were stained with 1.2% crystal violet, and plaque forming units were counted.

Results

As shown in **Figure 12A** and **12B**, treatment with the site 195 (RPI 13919) anti-HCV hammerhead enzymatic nucleic acid alone (0 U/ml IFN) resulted in viral replication that was dramatically reduced compared to SAC-treated cells (85%, $P<0.01$). For both IFN alfa 2a (**Figure 12A**) or IFN alfa 2b (**Figure 12B**), treatment with 25 U/ml resulted in a ~90% inhibition of HCV-PV replication in SAC-treated cells as compared to cells treated with SAC alone ($p<0.01$ for both observations). The maximal level of inhibition in SAC-treated cells (94%) was achieved by treatment with ≥50U/ml of either IFN alfa 2a or IFN alfa 2b ($p<0.01$ for both observations *versus* SAC alone). Maximal inhibition could however, be achieved by a 5-fold lower dose of IFN alfa 2a (10 U/ml) if enzymatic nucleic acid targeting site 195 in the 5' UTR of HCV RNA was given in combination (**Figure 12A**, $p<0.01$). While the additional effect of enzymatic nucleic acid treatment on IFN alfa 2b-treated cells at 10 U/ml was very slight, the combined effect with 25 U/ml IFN alfa 2b was greater in magnitude (**Figure 12B**). For both interferons tested, pretreatment with 25 U/ml in combination with 200 nM site 195 anti-HCV enzymatic nucleic acid resulted in an even greater level of inhibition of viral replication (>98%) compared to replication in cells treated with 200 nM SAC alone ($P<0.01$).

A dose response of the site 195 anti-HCV enzymatic nucleic acid was also performed in HeLa cells, either with or without 12.5 U/ml IFN alfa 2a or IFN alfa 2b pretreatment. As shown in **Figure 13**, enzymatic nucleic acid-mediated inhibition was dose-dependent and a

significant inhibition of HCV-PV replication (>75% *versus* 0 nM enzymatic nucleic acid, P<0.01) could be achieved by treatment with ≥150 nM anti-HCV enzymatic nucleic acid alone (no IFN). However, in IFN-pretreated cells, the dose of anti-HCV enzymatic nucleic acid needed to achieve this level of inhibition was decreased 3-fold to 50 nM (P<0.01 *versus* 0 nM enzymatic nucleic acid). In comparison, treatment with the site 195 anti-HCV enzymatic nucleic acid alone at 50 nM resulted in only ~40% inhibition of virus replication. Pretreatment with IFN enhanced the antiviral effect of site 195 enzymatic nucleic acid at all enzymatic nucleic acid doses, compared to no IFN pretreatment.

Interferon-alfacon1, consensus IFN (CIFN), is another type 1 IFN that is used to treat chronic HCV. To determine if a similar enhancement can occur in CIFN-treated cells, a dose response with CIFN was performed in HeLa cells using 0 U/ml to 12.5 U/ml CIFN in combination with 200 nM site 195 anti-HCV enzymatic nucleic acid or SAC treatment (**Figure 14A**). Again, in the presence of the site 195 anti-HCV enzymatic nucleic acid alone, viral replication was dramatically reduced compared to SAC-treated cells. As shown in **Figure 14A**, treatment with 200 nM anti-HCV enzymatic nucleic acid alone significantly inhibited HCV-PV replication (90% *versus* SAC treatment, P<0.01). However, pretreatment with concentrations of CIFN from 1 U/ml to 12.5 U/ml in combination with 200 nM anti-HCV enzymatic nucleic acid resulted in even greater inhibition of viral replication (>98%) compared to replication in cells treated with 200 nM SAC alone (P<0.01). It is important to note that pretreatment with 1 U/ml CIFN in SAC-treated cells did not have a significant effect on HCV-poliovirus replication, but in the presence of enzymatic nucleic acid a significant inhibition of replication was observed (>98%, P<0.01). Thus, the dose of CIFN needed to achieve a >98% inhibition could be lowered to 1 U/ml in cells also treated with 200 nM site 195 anti-HCV enzymatic nucleic acid.

A dose response of site 195 anti-HCV enzymatic nucleic acid was then performed in HeLa cells, either with or without 12.5 U/ml CIFN pretreatment. As shown in **Figure 14B**, a significant inhibition of HCV-PV replication (>95% *versus* 0 nM enzymatic nucleic acid, P<0.01) could be achieved by treatment with ≥150 nM anti-HCV enzymatic nucleic acid alone. However, in CIFN-pretreated cells, the dose of anti-HCV enzymatic nucleic acid needed to achieve this level of inhibition was only 50 nM (P<0.01). In comparison, treatment with the site 195 anti-HCV enzymatic nucleic acid alone at 50 nM resulted in ~50% inhibition

of virus replication. Thus, as was seen with IFN alfa 2a and IFN alfa 2b, the dose of enzymatic nucleic acid could be reduced 3-fold in the presence of CIFN pretreatment to achieve a similar antiviral effect as enzymatic nucleic acid-treatment alone.

To further explore the combination of lower enzymatic nucleic acid concentration and CIFN, a dose response with 0 U/ml to 12.5 U/ml CIFN was subsequently performed in HeLa cells in combination with 50 nM site 195 anti-HCV enzymatic nucleic acid treatment. In multiple experiments, treatment with 50 nM anti-HCV enzymatic nucleic acid alone inhibited HCV-PV replication 50% – 81% compared to viral replication in SAC-treated cells. As for the experiment shown in **Figure 14A**, treatment with CIFN alone at 5 U/ml resulted in ~50% inhibition of viral replication. However, a four hour pretreatment with 5 U/ml CIFN followed by 50 nM anti-HCV enzymatic nucleic acid treatment resulted in 95% - 97% inhibition compared to SAC-treated cells ($P<0.01$).

To demonstrate that the enhanced antiviral effect of CIFN and enzymatic nucleic acid combination treatment was dependent upon enzymatic nucleic acid cleavage activity, the effect of CIFN in combination with site 195 anti-HCV enzymatic nucleic acid versus the effect of CIFN in combination with a binding competent, attenuated core, control (BAC) was then compared. The BAC can still bind to its specific RNA target, but is greatly diminished in cleavage activity. Pretreatment with 12.5 U/ml CIFN reduced the viral yield ~90% (7-fold) in cells treated with BAC (compare CIFN versus BAC in **Figure 15**). Cells treated with 200 nM site 195 anti-HCV enzymatic nucleic acid alone produced ~95% (17-fold) less virus than BAC-treated cells (195 RZ BAC in **Figure 15**). The combination of CIFN pretreatment and 200 nM site 195 anti-HCV enzymatic nucleic acid results in an augmented >98% (300-fold) reduction in viral yield (CIFN+RZ versus control in **Figure 15**).

Cell Culture Assays

Although there have been reports of replication of HCV in cell culture (see below), these systems are difficult to replicate and have proven unreliable. Therefore, as was the case for development of other anti-HCV therapeutics such as interferon and ribavirin, after demonstration of safety in animal studies applicant can proceed directly into a clinical feasibility study.

Several recent reports have documented *in vitro* growth of HCV in human cell lines (Mizutani *et al.,* Biochem Biophys Res Commun 1996 227(3):822-826; Tagawa *et al.,* Journal of Gasteroenterology and Hepatology 1995 10(5):523-527; Cribier *et al., Journal of General Virology* 76(10):2485-2491; Seipp *et al., Journal of General Virology* 1997 78(10)2467-2478; Iacovacci *et al.,* Research Virology 1997 148(2):147-151; Iocavacci *et al.,* Hepatology 1997 26(5) 1328-1337; Ito *et al.,* Journal of General Virology 1996 77(5):1043-1054; Nakajima *et al., Journal of Virology* 1996 70(5):3325-3329; Mizutani *et al., Journal of Virology* 1996 70(10):7219-7223; Valli *et al., Res Virol* 1995 146(4): 285-288; Kato *et al., Biochem Biophys Res Comm* 1995 206(3):863-869). Replication of HCV has been demonstrated in both T and B cell lines as well as cell lines derived from human hepatocytes. Demonstration of replication was documented using either RT-PCR based assays or the b-DNA assay. It is important to note that the most recent publications regarding HCV cell cultures document replication for up to 6-months.

Additionally, another recent study has identified more robust strains of hepatitis C virus having adaptive mutations that allow the strains to replicate more vigorously in human cell culture (Rockefeller University, www.sciencedaily.com/releases/2000/12/001211075228.htm). The mutations that confer this enhanced ability to replicate are located in a specific region of a protein identified as NS5A. Studies performed at Rockefeller University have shown that in certain cell culture systems, infection with the robust strains produces a 10,000-fold increase in the number of infected cells. The greatly increased availability of HCV-infected cells in culture can be used to develop high-throughput screening assays, in which a large number of compounds, such as enzymatic nucleic acid molecules, can be tested to determine their effectiveness.

In addition to cell lines that can be infected with HCV, several groups have reported the successful transformation of cell lines with cDNA clones of full-length or partial HCV genomes (Harada *et al.,* Journal of General Virology 1995 76(5)1215-1221; Haramatsu *et al.,* Journal of Viral Hepatitis 1997 4S(1):61-67; Dash *et al.,* American Journal of Pathology 1997 151(2):363-373; Mizuno *et al.,* Gasteroenterology 1995 109(6):1933-40; Yoo *et al.,* Journal Of Virology 1995 69(1):32-38).

Animal Models

The best characterized animal system for HCV infection is the chimpanzee. Moreover, the chronic hepatitis that results from HCV infection in chimpanzees and humans is very similar. Although clinically relevant, the chimpanzee model suffers from several practical impediments that make use of this model difficult. These include; high cost, long incubation requirements and lack of sufficient quantities of animals. Due to these factors, a number of groups have attempted to develop rodent models of chronic hepatitis C infection. While direct infection has not been possible several groups have reported on the stable transfection of either portions or entire HCV genomes into rodents (Yamamoto *et al.*, Hepatology 1995 22(3): 847-855; Galun *et al.*, Journal of Infectious Disease 1995 172(1):25-30; Koike *et al.*, Journal of general Virology 1995 76(12)3031-3038; Pasquinelli *et al.*, Hepatology 1997 25(3): 719-727; Hayashi *et al.*, Princess Takamatsu Symp 1995 25:1430149; Mariya K, Yotsuyanagi H, Shintani Y, Fujie H, Ishibashi K, Matsuura Y, Miyamura T, Koike K. Hepatitis C virus core protein induces hepatic steatosis in transgenic mice. Journal of General Virology 1997 78(7) 1527-1531; Takehara *et al.*, Hepatology 1995 21(3):746-751; Kawamura *et al.*, Hepatology 1997 25(4): 1014-1021). In addition, transplantation of HCV infected human liver into immunocompromised mice results in prolonged detection of HCV RNA in the animal's blood.

Vierling, International PCT Publication No. WO 99/16307, describes a method for expressing hepatitis C virus in an *in vivo* animal model. Viable, HCV infected human hepatocytes are transplanted into a liver parenchyma of a scid/scid mouse host. The scid/scid mouse host is then maintained in a viable state, whereby viable, morphologically intact human hepatocytes persist in the donor tissue and hepatitis C virus is replicated in the persisting human hepatocytes. This model provides an effective means for the study of HCV inhibition by enzymatic nucleic acids *in vivo*.

Diagnostic uses

Enzymatic nucleic acids of this invention may be used as diagnostic tools to examine genetic drift and mutations within diseased cells or to detect the presence of *HCV* RNA in a cell. The close relationship between enzymatic nucleic acid activity and the structure of the target RNA allows the detection of mutations in any region of the molecule, which alters the base-pairing and three-dimensional structure of the target RNA. By using multiple enzymatic nucleic acids described in this invention, one may map nucleotide changes, which are important to RNA structure and function *in vitro*, as well as in cells and tissues. Cleavage of

target RNAs with enzymatic nucleic acids may be used to inhibit gene expression and define the role (essentially) of specified gene products in the progression of disease. In this manner, other genetic targets may be defined as important mediators of the disease. These experiments will lead to better treatment of the disease progression by affording the possibility of combination therapies (e.g., multiple enzymatic nucleic acids targeted to different genes, enzymatic nucleic acids coupled with known small molecule inhibitors, or intermittent treatment with combinations of enzymatic nucleic acids and/or other chemical or biological molecules). Other *in vitro* uses of enzymatic nucleic acids of this invention are well known in the art, and include detection of the presence of mRNAs associated with HCV related condition. Such RNA is detected by determining the presence of a cleavage product after treatment with a enzymatic nucleic acid using standard methodology.

In a specific example, enzymatic nucleic acids which can cleave only wild-type or mutant forms of the target RNA are used for the assay. The first enzymatic nucleic acid is used to identify wild-type RNA present in the sample and the second enzymatic nucleic acid will be used to identify mutant RNA in the sample. As reaction controls, synthetic substrates of both wild-type and mutant RNA will be cleaved by both enzymatic nucleic acids to demonstrate the relative enzymatic nucleic acid efficiencies in the reactions and the absence of cleavage of the "non-targeted" RNA species. The cleavage products from the synthetic substrates will also serve to generate size markers for the analysis of wild-type and mutant RNAs in the sample population. Thus each analysis will require two enzymatic nucleic acids, two substrates and one unknown sample which will be combined into six reactions. The presence of cleavage products will be determined using an RNase protection assay so that full-length and cleavage fragments of each RNA can be analyzed in one lane of a polyacrylamide gel. It is not absolutely required to quantify the results to gain insight into the expression of mutant RNAs and putative risk of the desired phenotypic changes in target cells. The expression of mRNA whose protein product is implicated in the development of the phenotype (*i.e.*, HCV) is adequate to establish risk. If probes of comparable specific activity are used for both transcripts, then a qualitative comparison of RNA levels will be adequate and will decrease the cost of the initial diagnosis. Higher mutant form to wild-type ratios will be correlated with higher risk whether RNA levels are compared qualitatively or quantitatively.

Additional Uses

Potential usefulness of sequence-specific enzymatic nucleic acid molecules of the instant invention might have many of the same applications for the study of RNA that DNA restriction endonucleases have for the study of DNA (Nathans *et al.*, 1975 *Ann. Rev. Biochem.* 44:273). For example, the pattern of restriction fragments could be used to establish sequence relationships between two related RNAs, and large RNAs could be specifically cleaved to fragments of a size more useful for study. The ability to engineer sequence specificity of the enzymatic nucleic acid molecule is ideal for cleavage of RNAs of unknown sequence. Applicant describes the use of nucleic acid molecules to down-regulate gene expression of target genes in bacterial, microbial, fungal, viral, and eukaryotic systems including plant, or mammalian cells.

TABLE I

Characteristics of naturally occurring ribozymes

Group I Introns

- Size: ~150 to >1000 nucleotides.
- Requires a U in the target sequence immediately 5' of the cleavage site.
- Binds 4-6 nucleotides at the 5'-side of the cleavage site.
- Reaction mechanism: attack by the 3'-OH of guanosine to generate cleavage products with 3'-OH and 5'-guanosine.
- Additional protein cofactors required in some cases to help folding and maintainance of the active structure.
- Over 300 known members of this class. Found as an intervening sequence in *Tetrahymena thermophila* rRNA, fungal mitochondria, chloroplasts, phage T4, blue-green algae, and others.
- Major structural features largely established through phylogenetic comparisons, mutagenesis, and biochemical studies [i, ii].
- Complete kinetic framework established for one ribozyme [iii, iv, v, vi].
- Studies of ribozyme folding and substrate docking underway [vii, viii, ix].
- Chemical modification investigation of important residues well established [x, xi].
- The small (4-6 nt) binding site may make this ribozyme too non-specific for targeted RNA cleavage, however, the Tetrahymena group I intron has been used to repair a "defective" β-galactosidase message by the ligation of new β-galactosidase sequences onto the defective message [xii].

RNAse P RNA (M1 RNA)

- Size: ~290 to 400 nucleotides.
- RNA portion of a ubiquitous ribonucleoprotein enzyme.
- Cleaves tRNA precursors to form mature tRNA [xiii].

- Reaction mechanism: possible attack by M^{2+}-OH to generate cleavage products with 3'-OH and 5'-phosphate.

- RNAse P is found throughout the prokaryotes and eukaryotes. The RNA subunit has been sequenced from bacteria, yeast, rodents, and primates.

- Recruitment of endogenous RNAse P for therapeutic applications is possible through hybridization of an External Guide Sequence (EGS) to the target RNA [xiv,xv]

- Important phosphate and 2' OH contacts recently identified [xvi,xvii]

Group II Introns

- Size: >1000 nucleotides.

- Trans cleavage of target RNAs recently demonstrated [xviii,xix].

- Sequence requirements not fully determined.

- Reaction mechanism: 2'-OH of an internal adenosine generates cleavage products with 3'-OH and a "lariat" RNA containing a 3'-5' and a 2'-5' branch point.

- Only natural ribozyme with demonstrated participation in DNA cleavage [xx,xxi] in addition to RNA cleavage and ligation.

- Major structural features largely established through phylogenetic comparisons [xxii].

- Important 2' OH contacts beginning to be identified [xxiii]

- Kinetic framework under development [xxiv]

Neurospora VS RNA

- Size: ~144 nucleotides.

- Trans cleavage of hairpin target RNAs recently demonstrated [xxv].

- Sequence requirements not fully determined.

- Reaction mechanism: attack by 2'-OH 5' to the scissile bond to generate cleavage products with 2',3'-cyclic phosphate and 5'-OH ends.

- Binding sites and structural requirements not fully determined.

- Only 1 known member of this class. Found in Neurospora VS RNA.

Hammerhead Ribozyme
(see text for references)

- Size: ~13 to 40 nucleotides.
- Requires the target sequence UH immediately 5' of the cleavage site.
- Binds a variable number nucleotides on both sides of the cleavage site.
- Reaction mechanism: attack by 2'-OH 5' to the scissile bond to generate cleavage products with 2',3'-cyclic phosphate and 5'-OH ends.
- 14 known members of this class. Found in a number of plant pathogens (virusoids) that use RNA as the infectious agent.
- Essential structural features largely defined, including 2 crystal structures [xxvi, xxvii]
- Minimal ligation activity demonstrated (for engineering through *in vitro* selection) [xxviii]
- Complete kinetic framework established for two or more ribozymes [xxix].
- Chemical modification investigation of important residues well established [xxx].

Hairpin Ribozyme

- Size: ~50 nucleotides.
- Requires the target sequence GUC immediately 3' of the cleavage site.
- Binds 4-6 nucleotides at the 5'-side of the cleavage site and a variable number to the 3'-side of the cleavage site.
- Reaction mechanism: attack by 2'-OH 5' to the scissile bond to generate cleavage products with 2',3'-cyclic phosphate and 5'-OH ends.
- 3 known members of this class. Found in three plant pathogen (satellite RNAs of the tobacco ringspot virus, arabis mosaic virus and chicory yellow mottle virus) which uses RNA as the infectious agent.
- Essential structural features largely defined [xxxi, xxxii, xxxiii, xxxiv]
- Ligation activity (in addition to cleavage activity) makes ribozyme amenable to engineering through *in vitro* selection [xxxv]
- Complete kinetic framework established for one ribozyme [xxxvi].
- Chemical modification investigation of important residues begun [xxxvii, xxxviii].

Hepatitis Delta Virus (HDV) Ribozyme

- Size: ~60 nucleotides.
- Trans cleavage of target RNAs demonstrated [xxxix].
- Binding sites and structural requirements not fully determined, although no sequences 5' of cleavage site are required. Folded ribozyme contains a pseudoknot structure [xl].
- Reaction mechanism: attack by 2'-OH 5' to the scissile bond to generate cleavage products with 2',3'-cyclic phosphate and 5'-OH ends.
- Only 2 known members of this class. Found in human HDV.
- Circular form of HDV is active and shows increased nuclease stability [xli]

Michel, Francois; Westhof, Eric. Slippery substrates. Nat. Struct. Biol. (1994), 1(1), 5-7.

Lisacek, Frederique; Diaz, Yolande; Michel, Francois. Automatic identification of group I intron cores in genomic DNA sequences. J. Mol. Biol. (1994), 235(4), 1206-17.

Herschlag, Daniel; Cech, Thomas R.. Catalysis of RNA cleavage by the Tetrahymena thermophila ribozyme. 1. Kinetic description of the reaction of an RNA substrate complementary to the active site. Biochemistry (1990), 29(44), 10159-71.

Herschlag, Daniel; Cech, Thomas R.. Catalysis of RNA cleavage by the Tetrahymena thermophila ribozyme. 2. Kinetic description of the reaction of an RNA substrate that forms a mismatch at the active site. Biochemistry (1990), 29(44), 10172-80.

Knitt, Deborah S.; Herschlag, Daniel. pH Dependencies of the Tetrahymena Ribozyme Reveal an Unconventional Origin of an Apparent pKa. Biochemistry (1996), 35(5), 1560-70.

Bevilacqua, Philip C.; Sugimoto, Naoki; Turner, Douglas H.. A mechanistic framework for the second step of splicing catalyzed by the Tetrahymena ribozyme. Biochemistry (1996), 35(2), 648-58.

Li, Yi; Bevilacqua, Philip C.; Mathews, David; Turner, Douglas H.. Thermodynamic and activation parameters for binding of a pyrene-labeled substrate by the Tetrahymena ribozyme: docking is not diffusion-controlled and is driven by a favorable entropy change. Biochemistry (1995), 34(44), 14394-9.

Banerjee, Aloke Raj; Turner, Douglas H.. The time dependence of chemical modification reveals slow steps in the folding of a group I ribozyme. Biochemistry (1995), 34(19), 6504-12.

Zarrinkar, Patrick P.; Williamson, James R.. The P9.1-P9.2 peripheral extension helps guide folding of the Tetrahymena ribozyme. Nucleic Acids Res. (1996), 24(5), 854-8.

Strobel, Scott A.; Cech, Thomas R.. Minor groove recognition of the conserved G.cntdot.U pair at the Tetrahymena ribozyme reaction site. Science (Washington, D. C.) (1995), 267(5198), 675-9.

Strobel, Scott A.; Cech, Thomas R.. Exocyclic Amine of the Conserved G.cntdot.U Pair at the Cleavage Site of the Tetrahymena Ribozyme Contributes to 5'-Splice Site Selection and Transition State Stabilization. Biochemistry (1996), 35(4), 1201-11.

Sullenger, Bruce A.; Cech, Thomas R.. Ribozyme-mediated repair of defective mRNA by targeted trans-splicing. Nature (London) (1994), 371(6498), 619-22.

Robertson, H.D.; Altman, S.; Smith, J.D. J. Biol. Chem., 247, 5243-5251 (1972).

Forster, Anthony C.; Altman, Sidney. External guide sequences for an RNA enzyme. Science (Washington, D. C., 1883-) (1990), 249(4970), 783-6.

Yuan, Y.; Hwang, E. S.; Altman, S. Targeted cleavage of mRNA by human RNase P. Proc. Natl. Acad. Sci. USA (1992) 89, 8006-10.

Harris, Michael E.; Pace, Norman R.. Identification of phosphates involved in catalysis by the ribozyme RNase P RNA. RNA (1995), 1(2), 210-18.

Pan, Tao; Loria, Andrew; Zhong, Kun. Probing of tertiary interactions in RNA: 2'-hydroxyl-base contacts between the RNase P RNA and pre-tRNA. Proc. Natl. Acad. Sci. U. S. A. (1995), 92(26), 12510-14.

Pyle, Anna Marie; Green, Justin B.. Building a Kinetic Framework for Group II Intron Ribozyme Activity: Quantitation of Interdomain Binding and Reaction Rate. Biochemistry (1994), 33(9), 2716-25.

Michels, William J. Jr.; Pyle, Anna Marie. Conversion of a Group II Intron into a New Multiple-Turnover Ribozyme that Selectively Cleaves Oligonucleotides: Elucidation of Reaction Mechanism and Structure/Function Relationships. Biochemistry (1995), 34(9), 2965-77.

Zimmerly, Steven; Guo, Huatao; Eskes, Robert; Yang, Jian; Perlman, Philip S.; Lambowitz, Alan M.. A group II intron RNA is a catalytic component of a DNA endonuclease involved in intron mobility. Cell (Cambridge, Mass.) (1995), 83(4), 529-38.

Griffin, Edmund A., Jr.; Qin, Zhifeng; Michels, Williams J., Jr.; Pyle, Anna Marie. Group II intron ribozymes that cleave DNA and RNA linkages with similar efficiency, and lack contacts with substrate 2'-hydroxyl groups. Chem. Biol. (1995), 2(11), 761-70.

Michel, Francois; Ferat, Jean Luc. Structure and activities of group II introns. Annu. Rev. Biochem. (1995), 64, 435-61.

Abramovitz, Dana L.; Friedman, Richard A.; Pyle, Anna Marie. Catalytic role of 2'-hydroxyl

groups within a group II intron active site. Science (Washington, D. C.) (1996), 271(5254), 1410-13.

Daniels, Danette L.; Michels, William J., Jr.; Pyle, Anna Marie. Two competing pathways for self-splicing by group II introns: a quantitative analysis of in vitro reaction rates and products. J. Mol. Biol. (1996), 256(1), 31-49.

Guo, Hans C. T.; Collins, Richard A.. Efficient trans-cleavage of a stem-loop RNA substrate by a ribozyme derived from Neurospora VS RNA. EMBO J. (1995), 14(2), 368-76.

Scott, W.G., Finch, J.T., Aaron,K. The crystal structure of an all RNA hammerhead ribozyme:Aproposed mechanism for RNA catalytic cleavage. Cell, (1995), 81, 991-1002.

McKay, Structure and function of the hammerhead ribozyme: an unfinished story. RNA, (1996), 2, 395-403.

Long, D., Uhlenbeck, O., Hertel, K. Ligation with hammerhead ribozymes. US Patent No. 5,633,133.

Hertel, K.J., Herschlag, D., Uhlenbeck, O. A kinetic and thermodynamic framework for the hammerhead ribozyme reaction. Biochemistry, (1994) 33, 3374-3385.Beigelman, L., *et al.,* Chemical modifications of hammerhead ribozymes. J. Biol. Chem., (1995) 270, 25702-25708.

Beigelman, L., *et al.,* Chemical modifications of hammerhead ribozymes. J. Biol. Chem., (1995) 270, 25702-25708.

Hampel, Arnold; Tritz, Richard; Hicks, Margaret; Cruz, Phillip. 'Hairpin' catalytic RNA model: evidence for helixes and sequence requirement for substrate RNA. Nucleic Acids Res. (1990), 18(2), 299-304.

Chowrira, Bharat M.; Berzal-Herranz, Alfredo; Burke, John M.. Novel guanosine requirement for catalysis by the hairpin ribozyme. Nature (London) (1991), 354(6351), 320-2.

Berzal-Herranz, Alfredo; Joseph, Simpson; Chowrira, Bharat M.; Butcher, Samuel E.; Burke, John M.. Essential nucleotide sequences and secondary structure elements of the hairpin ribozyme. EMBO J. (1993), 12(6), 2567-73.

Joseph, Simpson; Berzal-Herranz, Alfredo; Chowrira, Bharat M.; Butcher, Samuel E.. Substrate selection rules for the hairpin ribozyme determined by in vitro selection, mutation, and analysis of mismatched substrates. Genes Dev. (1993), 7(1), 130-8.

Berzal-Herranz, Alfredo; Joseph, Simpson; Burke, John M.. In vitro selection of active hairpin ribozymes by sequential RNA-catalyzed cleavage and ligation reactions. Genes Dev. (1992), 6(1), 129-34.

Hegg, Lisa A.; Fedor, Martha J.. Kinetics and Thermodynamics of Intermolecular Catalysis by Hairpin Ribozymes. Biochemistry (1995), 34(48), 15813-28.

Grasby, Jane A.; Mersmann, Karin; Singh, Mohinder; Gait, Michael J.. Purine Functional Groups in Essential Residues of the Hairpin Ribozyme Required for Catalytic Cleavage of RNA. Biochemistry (1995), 34(12), 4068-76.

Schmidt, Sabine; Beigelman, Leonid; Karpeisky, Alexander; Usman, Nassim; Sorensen, Ulrik S.; Gait, Michael J.. Base and sugar requirements for RNA cleavage of essential nucleoside residues in internal loop B of the hairpin ribozyme: implications for secondary structure. Nucleic Acids Res. (1996), 24(4), 573-81.

Perrotta, Anne T.; Been, Michael D.. Cleavage of oligoribonucleotides by a ribozyme derived from the hepatitis .delta. virus RNA sequence. Biochemistry (1992), 31(1), 16-21.

Perrotta, Anne T.; Been, Michael D.. A pseudoknot-like structure required for efficient self-cleavage of hepatitis delta virus RNA. Nature (London) (1991), 350(6317), 434-6.

Puttaraju, M.; Perrotta, Anne T.; Been, Michael D.. A circular trans-acting hepatitis delta virus ribozyme. Nucleic Acids Res. (1993), 21(18), 4253

Table II:

A. 2.5 µmol Synthesis Cycle ABI 394 Instrument

Reagent	Equivalents	Amount	Wait Time* DNA	Wait Time* 2'-O-methyl	Wait Time* RNA
Phosphoramidites	6.5	163 µL	45 sec	2.5 min	7.5 min
S-Ethyl Tetrazole	23.8	238 µL	45 sec	2.5 min	7.5 min
Acetic Anhydride	100	233 µL	5 sec	5 sec	5 sec
N-Methyl Imidazole	186	233 µL	5 sec	5 sec	5 sec
TCA	176	2.3 mL	21 sec	21 sec	21 sec
Iodine	11.2	1.7 mL	45 sec	45 sec	45 sec
Beaucage	12.9	645 µL	100 sec	300 sec	300 sec
Acetonitrile	NA	6.67 mL	NA	NA	NA

B. 0.2 µmol Synthesis Cycle ABI 394 Instrument

Reagent	Equivalents	Amount	Wait Time* DNA	Wait Time* 2'-O-methyl	Wait Time* RNA
Phosphoramidites	15	31 µL	45 sec	233 sec	465 sec
S-Ethyl Tetrazole	38.7	31 µL	45 sec	233 min	465 sec
Acetic Anhydride	655	124 µL	5 sec	5 sec	5 sec
N-Methyl Imidazole	1245	124 µL	5 sec	5 sec	5 sec
TCA	700	732 µL	10 sec	10 sec	10 sec
Iodine	20.6	244 µL	15 sec	15 sec	15 sec
Beaucage	7.7	232 µL	100 sec	300 sec	300 sec
Acetonitrile	NA	2.64 mL	NA	NA	NA

C. 0.2 µmol Synthesis Cycle 96 well Instrument

Reagent	Equivalents DNA/2'-O-methyl/Ribo	Amount DNA/2'-O-methyl/Ribo	Wait Time * DNA	Wait Time * 2'-O-methyl	Wait Time * Ribo
Phosphoramidites	22/33/66	40/60/120 µL	60 sec	180 sec	360sec
S-Ethyl Tetrazole	70/105/210	40/60/120 µL	60 sec	180 min	360 sec
Acetic Anhydride	265/265/265	50/50/50 µL	10 sec	10 sec	10 sec
N-Methyl Imidazole	502/502/502	50/50/50 µL	10 sec	10 sec	10 sec
TCA	238/475/475	250/500/500 µL	15 sec	15 sec	15 sec
Iodine	6.8/6.8/6.8	80/80/80 µL	30 sec	30 sec	30 sec
Beaucage	34/51/51	80/120/120	100 sec	200 sec	200 sec
Acetonitrile	NA	1150/1150/1150 µL	NA	NA	NA

- **Wait time does not include contact time during delivery.**

Table III: HCV DNAzyme and Substrate Sequence

Pos	Substrate	Seq ID	DNAzyme	Seq ID
10	UGGGGGCG A CACUCCAC	1	GTGGAGTG GGCTAGCTACAACGA CGCCCCCA	4798
12	GGGGCGAC A CUCCACCA	2	TGGTGGAG GGCTAGCTACAACGA GTCGCCCC	4799
17	GACACUCC A CCAUAGAU	3	ATCTATGG GGCTAGCTACAACGA GGAGTGTC	4800
20	ACUCCACC A UAGAUCAC	4	GTGATCTA GGCTAGCTACAACGA GGTGGAGT	4801
24	CACCAUAG A UCACUCCC	5	GGGAGTGA GGCTAGCTACAACGA CTATGGTG	4802
27	CAUAGAUC A CUCCCCUG	6	CAGGGGAG GGCTAGCTACAACGA GATCTATG	4803
35	ACUCCCCU G UGAGGAAC	7	GTTCCTCA GGCTAGCTACAACGA AGGGGAGT	4804
42	UGUGAGGA A CUACUGUC	8	GACAGTAG GGCTAGCTACAACGA TCCTCACA	4805
45	GAGGAACU A CUGUCUUC	9	GAAGACAG GGCTAGCTACAACGA AGTTCCTC	4806
48	GAACUACU G UCUUCACG	10	CGTGAAGA GGCTAGCTACAACGA AGTAGTTC	4807
54	CUGUCUUC A CGCAGAAA	11	TTTCTGCG GGCTAGCTACAACGA GAAGACAG	4808
56	GUCUUCAC G CAGAAAGC	12	GCTTTCTG GGCTAGCTACAACGA GTGAAGAC	4809
63	CGCAGAAA G CGUCUAGC	13	GCTAGACG GGCTAGCTACAACGA TTTCTGCG	4810
65	CAGAAAGC G UCUAGCCA	14	TGGCTAGA GGCTAGCTACAACGA GCTTTCTG	4811
70	AGCGUCUA G CCAUGGCG	15	CGCCATGG GGCTAGCTACAACGA TAGACGCT	4812
73	GUCUAGCC A UGGCGUUA	16	TAACGCCA GGCTAGCTACAACGA GGCTAGAC	4813
76	UAGCCAUG G CGUUAGUA	17	TACTAACG GGCTAGCTACAACGA CATGGCTA	4814
78	GCCAUGGC G UUAGUAUG	18	CATACTAA GGCTAGCTACAACGA GCCATGGC	4815
82	UGGCGUUA G UAUGAGUG	19	CACTCATA GGCTAGCTACAACGA TAACGCCA	4816
84	GCGUUAGU A UGAGUGUC	20	GACACTCA GGCTAGCTACAACGA ACTAACGC	4817
88	UAGUAUGA G UGUCGUGC	21	GCACGACA GGCTAGCTACAACGA TCATACTA	4818
90	GUAUGAGU G UCGUGCAG	22	CTGCACGA GGCTAGCTACAACGA ACTCATAC	4819
93	UGAGUGUC G UGCAGCCU	23	AGGCTGCA GGCTAGCTACAACGA GACACTCA	4820
95	AGUGUCGU G CAGCCUCC	24	GGAGGCTG GGCTAGCTACAACGA ACGACACT	4821
98	GUCGUGCA G CCUCCAGG	25	CCTGGAGG GGCTAGCTACAACGA TGCACGAC	4822
107	CCUCCAGG A CCCCCCCU	26	AGGGGGGG GGCTAGCTACAACGA CCTGGAGG	4823
125	CCGGGAGA G CCAUAGUG	27	CACTATGG GGCTAGCTACAACGA TCTCCCGG	4824
128	GGAGAGCC A UAGUGGUC	28	GACCACTA GGCTAGCTACAACGA GGCTCTCC	4825
131	GAGCCAUA G UGGUCUGC	29	GCAGACCA GGCTAGCTACAACGA TATGGCTC	4826
134	CCAUAGUG G UCUGCGGA	30	TCCGCAGA GGCTAGCTACAACGA CACTATGG	4827
138	AGUGGUCU G CGGAACCG	31	CGGTTCCG GGCTAGCTACAACGA AGACCACT	4828
143	UCUGCGGA A CCGGUGAG	32	CTCACCGG GGCTAGCTACAACGA TCCGCAGA	4829
147	CGGAACCG G UGAGUACA	33	TGTACTCA GGCTAGCTACAACGA CGGTTCCG	4830
151	ACCGGUGA G UACACCGG	34	CCGGTGTA GGCTAGCTACAACGA TCACCGGT	4831
153	CGGUGAGU A CACCGGAA	35	TTCCGGTG GGCTAGCTACAACGA ACTCACCG	4832
155	GUGAGUAC A CCGGAAUU	36	AATTCCGG GGCTAGCTACAACGA GTACTCAC	4833
161	ACACCGGA A UUGCCAGG	37	CCTGGCAA GGCTAGCTACAACGA TCCGGTGT	4834
164	CCGGAAUU G CCAGGACG	38	CGTCCTGG GGCTAGCTACAACGA AATTCCGG	4835
170	UUGCCAGG A CGACCGGG	39	CCCGGTCG GGCTAGCTACAACGA CCTGGCAA	4836
173	CCAGGACG A CCGGGUCC	40	GGACCCGG GGCTAGCTACAACGA CGTCCTGG	4837
178	ACGACCGG G UCCUUUCU	41	AGAAAGGA GGCTAGCTACAACGA CCGGTCGT	4838
190	UUUCUUGG A UCAACCCG	42	CGGGTTGA GGCTAGCTACAACGA CCAAGAAA	4839
194	UUGGAUCA A CCCGCUCA	43	TGAGCGGG GGCTAGCTACAACGA TGATCCAA	4840
198	AUCAACCC G CUCAAUGC	44	GCATTGAG GGCTAGCTACAACGA GGGTTGAT	4841
203	CCCGCUCA A UGCCUGGA	45	TCCAGGCA GGCTAGCTACAACGA TGAGCGGG	4842
205	CGCUCAAU G CCUGGAGA	46	TCTCCAGG GGCTAGCTACAACGA ATTGAGCG	4843
213	GCCUGGAG A UUUGGGCG	47	CGCCCAAA GGCTAGCTACAACGA CTCCAGGC	4844
219	AGAUUUGG G CGUGCCCC	48	GGGGCACG GGCTAGCTACAACGA CCAAATCT	4845
221	AUUUGGGC G UGCCCCCG	49	CGGGGGCA GGCTAGCTACAACGA GCCCAAAT	4846
223	UUGGGCGU G CCCCCGCG	50	CGCGGGGG GGCTAGCTACAACGA ACGCCCAA	4847
229	GUGCCCCC G CGAGACUG	51	CAGTCTCG GGCTAGCTACAACGA GGGGGCAC	4848
234	CCCGCGAG A CUGCUAGC	52	GCTAGCAG GGCTAGCTACAACGA CTCGCGGG	4849

237	GCGAGACU G CUAGCCGA	53	TCGGCTAG GGCTAGCTACAACGA AGTCTCGC	4850
241	GACUGCUA G CCGAGUAG	54	CTACTCGG GGCTAGCTACAACGA TAGCAGTC	4851
246	CUAGCCGA G UAGUGUUG	55	CAACACTA GGCTAGCTACAACGA TCGGCTAG	4852
249	GCCGAGUA G UGUUGGGU	56	ACCCAACA GGCTAGCTACAACGA TACTCGGC	4853
251	CGAGUAGU G UUGGGUCG	57	CGACCCAA GGCTAGCTACAACGA ACTACTCG	4854
256	AGUGUUGG G UCGCGAAA	58	TTTCGCGA GGCTAGCTACAACGA CCAACACT	4855
259	GUUGGGUC G CGAAAGGC	59	GCCTTTCG GGCTAGCTACAACGA GACCCAAC	4856
266	CGCGAAAG G CCUUGUGG	60	CCACAAGG GGCTAGCTACAACGA CTTTCGCG	4857
271	AAGGCCUU G UGGUACUG	61	CAGTACCA GGCTAGCTACAACGA AAGGCCTT	4858
274	GCCUUGUG G UACUGCCU	62	AGGCAGTA GGCTAGCTACAACGA CACAAGGC	4859
276	CUUGUGGU A CUGCCUGA	63	TCAGGCAG GGCTAGCTACAACGA ACCACAAG	4860
279	GUGGUACU G CCUGAUAG	64	CTATCAGG GGCTAGCTACAACGA AGTACCAC	4861
284	ACUGCCUG A UAGGGUGC	65	GCACCCTA GGCTAGCTACAACGA CAGGCAGT	4862
289	CUGAUAGG G UGCUUGCG	66	CGCAAGCA GGCTAGCTACAACGA CCTATCAG	4863
291	GAUAGGGU G CUUGCGAG	67	CTCGCAAG GGCTAGCTACAACGA ACCCTATC	4864
295	GGGUGCUU G CGAGUGCC	68	GGCACTCG GGCTAGCTACAACGA AAGCACCC	4865
299	GCUUGCGA G UGCCCCGG	69	CCGGGGCA GGCTAGCTACAACGA TCGCAAGC	4866
301	UUGCGAGU G CCCCGGGA	70	TCCCGGGG GGCTAGCTACAACGA ACTCGCAA	4867
311	CCCGGGAG G UCUCGUAG	71	CTACGAGA GGCTAGCTACAACGA CTCCCGGG	4868
316	GAGGUCUC G UAGACCGU	72	ACGGTCTA GGCTAGCTACAACGA GAGACCTC	4869
320	UCUCGUAG A CCGUGCAC	73	GTGCACGG GGCTAGCTACAACGA CTACGAGA	4870
323	CGUAGACC G UGCACCAU	74	ATGGTGCA GGCTAGCTACAACGA GGTCTACG	4871
325	UAGACCGU G CACCAUGA	75	TCATGGTG GGCTAGCTACAACGA ACGGTCTA	4872
327	GACCGUGC A CCAUGAGC	76	GCTCATGG GGCTAGCTACAACGA GCACGGTC	4873
330	CGUGCACC A UGAGCACG	77	CGTGCTCA GGCTAGCTACAACGA GGTGCACG	4874
334	CACCAUGA G CACGAAUC	78	GATTCGTG GGCTAGCTACAACGA TCATGGTG	4875
336	CCAUGAGC A CGAAUCCU	79	AGGATTCG GGCTAGCTACAACGA GCTCATGG	4876
340	GAGCACGA A UCCUAAAC	80	GTTTAGGA GGCTAGCTACAACGA TCGTGCTC	4877
347	AAUCCUAA A CCUCAAAG	81	CTTTGAGG GGCTAGCTACAACGA TTAGGATT	4878
360	AAAGAAAA A CCAAACGU	82	ACGTTTGG GGCTAGCTACAACGA TTTTCTTT	4879
365	AAAACCAA A CGUAACAC	83	GTGTTACG GGCTAGCTACAACGA TTGGTTTT	4880
367	AACCAAAC G UAACACCA	84	TGGTGTTA GGCTAGCTACAACGA GTTTGGTT	4881
370	CAAACGUA A CACCAACC	85	GGTTGGTG GGCTAGCTACAACGA TACGTTTG	4882
372	AACGUAAC A CCAACCGC	86	GCGGTTGG GGCTAGCTACAACGA GTTACGTT	4883
376	UAACACCA A CCGCCGCC	87	GGCGGCGG GGCTAGCTACAACGA TGGTGTTA	4884
379	CACCAACC G CCGCCCAC	88	GTGGGCGG GGCTAGCTACAACGA GGTTGGTG	4885
382	CAACCGCC G CCCACAGG	89	CCTGTGGG GGCTAGCTACAACGA GGCGGTTG	4886
386	CGCCGCCC A CAGGACGU	90	ACGTCCTG GGCTAGCTACAACGA GGGCGGCG	4887
391	CCCACAGG A CGUCAAGU	91	ACTTGACG GGCTAGCTACAACGA CCTGTGGG	4888
393	CACAGGAC G UCAAGUUC	92	GAACTTGA GGCTAGCTACAACGA GTCCTGTG	4889
398	GACGUCAA G UUCCCGGG	93	CCCGGGAA GGCTAGCTACAACGA TTGACGTC	4890
406	GUUCCCGG G CGGUGGUC	94	GACCACCG GGCTAGCTACAACGA CCGGGAAC	4891
409	CCCGGGCG G UGGUCAGA	95	TCTGACCA GGCTAGCTACAACGA CGCCCGGG	4892
412	GGGCGGUG G UCAGAUCG	96	CGATCTGA GGCTAGCTACAACGA CACCGCCC	4893
417	GUGGUCAG A UCGUUGGU	97	ACCAACGA GGCTAGCTACAACGA CTGACCAC	4894
420	GUCAGAUC G UUGGUGGA	98	TCCACCAA GGCTAGCTACAACGA GATCTGAC	4895
424	GAUCGUUG G UGGAGUUU	99	AAACTCCA GGCTAGCTACAACGA CAACGATC	4896
429	UUGGUGGA G UUUACCUG	100	CAGGTAAA GGCTAGCTACAACGA TCCACCAA	4897
433	UGGAGUUU A CCUGUUGC	101	GCAACAGG GGCTAGCTACAACGA AAACTCCA	4898
437	GUUUACCU G UUGCCGCG	102	CGCGGCAA GGCTAGCTACAACGA AGGTAAAC	4899
440	UACCUGUU G CCGCGCAG	103	CTGCGCGG GGCTAGCTACAACGA AACAGGTA	4900
443	CUGUUGCC G CGCAGGGG	104	CCCCTGCG GGCTAGCTACAACGA GGCAACAG	4901
445	GUUGCCGC G CAGGGGCC	105	GGCCCCTG GGCTAGCTACAACGA GCGGCAAC	4902
451	GCGCAGGG G CCCCAGGU	106	ACCTGGGG GGCTAGCTACAACGA CCCTGCGC	4903
458	GGCCCCAG G UUGGGUGU	107	ACACCCAA GGCTAGCTACAACGA CTGGGGCC	4904
463	CAGGUUGG G UGUGCGCG	108	CGCGCACA GGCTAGCTACAACGA CCAACCTG	4905
465	GGUUGGGU G UGCGCGCG	109	CGCGCGCA GGCTAGCTACAACGA ACCCAACC	4906

467	UUGGGUGU G CGCGCGAC	110	GTCGCGCG GGCTAGCTACAACGA ACACCCAA	4907
469	GGGUGUGC G CGCGACUA	111	TAGTCGCG GGCTAGCTACAACGA GCACACCC	4908
471	GUGUGCGC G CGACUAGG	112	CCTAGTCG GGCTAGCTACAACGA GCGCACAC	4909
474	UGCGCGCG A CUAGGAAG	113	CTTCCTAG GGCTAGCTACAACGA CGCGCGCA	4910
483	CUAGGAAG A CUUCCGAG	114	CTCGGAAG GGCTAGCTACAACGA CTTCCTAG	4911
491	ACUUCCGA G CGGUCGCA	115	TGCGACCG GGCTAGCTACAACGA TCGGAAGT	4912
494	UCCGAGCG G UCGCAACC	116	GGTTGCGA GGCTAGCTACAACGA CGCTCGGA	4913
497	GAGCGGUC G CAACCUCG	117	CGAGGTTG GGCTAGCTACAACGA GACCGCTC	4914
500	CGGUCGCA A CCUCGUGG	118	CCACGAGG GGCTAGCTACAACGA TGCGACCG	4915
505	GCAACCUC G UGGAAGGC	119	GCCTTCCA GGCTAGCTACAACGA GAGGTTGC	4916
512	CGUGGAAG G CGACAACC	120	GGTTGTCG GGCTAGCTACAACGA CTTCCACG	4917
515	GGAAGGCG A CAACCUAU	121	ATAGGTTG GGCTAGCTACAACGA CGCCTTCC	4918
518	AGGCGACA A CCUAUCCC	122	GGGATAGG GGCTAGCTACAACGA TGTCGCCT	4919
522	GACAACCU A UCCCCAAG	123	CTTGGGGA GGCTAGCTACAACGA AGGTTGTC	4920
531	UCCCCAAG G CUCGCCGG	124	CCGGCGAG GGCTAGCTACAACGA CTTGGGGA	4921
535	CAAGGCUC G CCGGCCCG	125	CGGGCCGG GGCTAGCTACAACGA GAGCCTTG	4922
539	GCUCGCCG G CCCGAGGG	126	CCCTCGGG GGCTAGCTACAACGA CGGCGAGC	4923
547	GCCCGAGG G CAGGGCCU	127	AGGCCCTG GGCTAGCTACAACGA CCTCGGGC	4924
552	AGGGCAGG G CCUGGGCU	128	AGCCCAGG GGCTAGCTACAACGA CCTGCCCT	4925
558	GGGCCUGG G CUCAGCCC	129	GGGCTGAG GGCTAGCTACAACGA CCAGGCCC	4926
563	UGGGCUCA G CCCGGGUA	130	TACCCGGG GGCTAGCTACAACGA TGAGCCCA	4927
569	CAGCCCGG G UACCCUUG	131	CAAGGGTA GGCTAGCTACAACGA CCGGGCTG	4928
571	GCCCGGGU A CCCUUGGC	132	GCCAAGGG GGCTAGCTACAACGA ACCCGGGC	4929
578	UACCCUUG G CCCCUCUA	133	TAGAGGGG GGCTAGCTACAACGA CAAGGGTA	4930
586	GCCCCUCU A UGGCAAUG	134	CATTGCCA GGCTAGCTACAACGA AGAGGGGC	4931
589	CCUCUAUG G CAAUGAGG	135	CCTCATTG GGCTAGCTACAACGA CATAGAGG	4932
592	CUAUGGCA A UGAGGGCU	136	AGCCCTCA GGCTAGCTACAACGA TGCCATAG	4933
598	CAAUGAGG G CUUAGGGU	137	ACCCTAAG GGCTAGCTACAACGA CCTCATTG	4934
605	GGCUUAGG G UGGGCAGG	138	CCTGCCCA GGCTAGCTACAACGA CCTAAGCC	4935
609	UAGGGUGG G CAGGAUGG	139	CCATCCTG GGCTAGCTACAACGA CCACCCTA	4936
614	UGGGCAGG A UGGCUCCU	140	AGGAGCCA GGCTAGCTACAACGA CCTGCCCA	4937
617	GCAGGAUG G CUCCUGUC	141	GACAGGAG GGCTAGCTACAACGA CATCCTGC	4938
623	UGGCUCCU G UCACCCCG	142	CGGGGTGA GGCTAGCTACAACGA AGGAGCCA	4939
626	CUCCUGUC A CCCCGCGG	143	CCGCGGGG GGCTAGCTACAACGA GACAGGAG	4940
631	GUCACCCC G CGGCUCCC	144	GGGAGCCG GGCTAGCTACAACGA GGGGTGAC	4941
634	ACCCCGCG G CUCCCGGC	145	GCCGGGAG GGCTAGCTACAACGA CGCGGGGT	4942
641	GGCUCCCG G CCUAGUUG	146	CAACTAGG GGCTAGCTACAACGA CGGGAGCC	4943
646	CCGGCCUA G UUGGGGCC	147	GGCCCCAA GGCTAGCTACAACGA TAGGCCGG	4944
652	UAGUUGGG G CCCCACGG	148	CCGTGGGG GGCTAGCTACAACGA CCCAACTA	4945
657	GGGGCCCC A CGGACCCC	149	GGGGTCCG GGCTAGCTACAACGA GGGGCCCC	4946
661	CCCCACGG A CCCCCGGC	150	GCCGGGGG GGCTAGCTACAACGA CCGTGGGG	4947
668	GACCCCCG G CGUAGGUC	151	GACCTACG GGCTAGCTACAACGA CGGGGGTC	4948
670	CCCCCGGC G UAGGUCGC	152	GCGACCTA GGCTAGCTACAACGA GCCGGGGG	4949
674	CGGCGUAG G UCGCGUAA	153	TTACGCGA GGCTAGCTACAACGA CTACGCCG	4950
677	CGUAGGUC G CGUAACUU	154	AAGTTACG GGCTAGCTACAACGA GACCTACG	4951
679	UAGGUCGC G UAACUUGG	155	CCAAGTTA GGCTAGCTACAACGA GCGACCTA	4952
682	GUCGCGUA A CUUGGGUA	156	TACCCAAG GGCTAGCTACAACGA TACGCGAC	4953
688	UAACUUGG G UAAGGUCA	157	TGACCTTA GGCTAGCTACAACGA CCAAGTTA	4954
693	UGGGUAAG G UCAUCGAU	158	ATCGATGA GGCTAGCTACAACGA CTTACCCA	4955
696	GUAAGGUC A UCGAUACC	159	GGTATCGA GGCTAGCTACAACGA GACCTTAC	4956
700	GGUCAUCG A UACCCUCA	160	TGAGGGTA GGCTAGCTACAACGA CGATGACC	4957
702	UCAUCGAU A CCCUCACA	161	TGTGAGGG GGCTAGCTACAACGA ATCGATGA	4958
708	AUACCCUC A CAUGCGGC	162	GCCGCATG GGCTAGCTACAACGA GAGGGTAT	4959
710	ACCCUCAC A UGCGGCUU	163	AAGCCGCA GGCTAGCTACAACGA GTGAGGGT	4960
712	CCUCACAU G CGGCUUCG	164	CGAAGCCG GGCTAGCTACAACGA ATGTGAGG	4961
715	CACAUGCG G CUUCGCCG	165	CGGCGAAG GGCTAGCTACAACGA CGCATGTG	4962
720	GCGGCUUC G CCGACCUC	166	GAGGTCGG GGCTAGCTACAACGA GAAGCCGC	4963

724	CUUCGCCG A CCUCAUGG	167	CCATGAGG GGCTAGCTACAACGA CGGCGAAG	4964
729	CCGACCUC A UGGGGUAC	168	GTACCCCA GGCTAGCTACAACGA GAGGTCGG	4965
734	CUCAUGGG G UACAUUCC	169	GGAATGTA GGCTAGCTACAACGA CCCATGAG	4966
736	CAUGGGGU A CAUUCCGC	170	GCGGAATG GGCTAGCTACAACGA ACCCCATG	4967
738	UGGGGUAC A UUCCGCUC	171	GAGCGGAA GGCTAGCTACAACGA GTACCCCA	4968
743	UACAUUCC G CUCGUCGG	172	CCGACGAG GGCTAGCTACAACGA GGAATGTA	4969
747	UUCCGCUC G UCGGCGCC	173	GGCGCCGA GGCTAGCTACAACGA GAGCGGAA	4970
751	GCUCGUCG G CGCCCCCU	174	AGGGGGCG GGCTAGCTACAACGA CGACGAGC	4971
753	UCGUCGGC G CCCCCUUG	175	CAAGGGGG GGCTAGCTACAACGA GCCGACGA	4972
766	CUUGGGAG G CACUGCCA	176	TGGCAGTG GGCTAGCTACAACGA CTCCCAAG	4973
768	UGGGAGGC A CUGCCAGG	177	CCTGGCAG GGCTAGCTACAACGA GCCTCCCA	4974
771	GAGGCACU G CCAGGGCC	178	GGCCCTGG GGCTAGCTACAACGA AGTGCCTC	4975
777	CUGCCAGG G CCCUGGCG	179	CGCCAGGG GGCTAGCTACAACGA CCTGGCAG	4976
783	GGGCCCUG G CGCAUGGC	180	GCCATGCG GGCTAGCTACAACGA CAGGGCCC	4977
785	GCCCUGGC G CAUGGCGU	181	ACGCCATG GGCTAGCTACAACGA GCCAGGGC	4978
787	CCUGGCGC A UGGCGUCC	182	GGACGCCA GGCTAGCTACAACGA GCGCCAGG	4979
790	GGCGCAUG G CGUCCGGG	183	CCCGGACG GGCTAGCTACAACGA CATGCGCC	4980
792	CGCAUGGC G UCCGGGUU	184	AACCCGGA GGCTAGCTACAACGA GCCATGCG	4981
798	GCGUCCGG G UUCUGGAA	185	TTCCAGAA GGCTAGCTACAACGA CCGGACGC	4982
808	UCUGGAAG A CGGCGUGA	186	TCACGCCG GGCTAGCTACAACGA CTTCCAGA	4983
811	GGAAGACG G CGUGAACU	187	AGTTCACG GGCTAGCTACAACGA CGTCTTCC	4984
813	AAGACGGC G UGAACUAU	188	ATAGTTCA GGCTAGCTACAACGA GCCGTCTT	4985
817	CGGCGUGA A CUAUGCAA	189	TTGCATAG GGCTAGCTACAACGA TCACGCCG	4986
820	CGUGAACU A UGCAACAG	190	CTGTTGCA GGCTAGCTACAACGA AGTTCACG	4987
822	UGAACUAU G CAACAGGG	191	CCCTGTTG GGCTAGCTACAACGA ATAGTTCA	4988
825	ACUAUGCA A CAGGGAAU	192	ATTCCCTG GGCTAGCTACAACGA TGCATAGT	4989
832	AACAGGGA A UCUGCCCG	193	CGGGCAGA GGCTAGCTACAACGA TCCCTGTT	4990
836	GGGAAUCU G CCCGGUUG	194	CAACCGGG GGCTAGCTACAACGA AGATTCCC	4991
841	UCUGCCCG G UUGCUCUU	195	AAGAGCAA GGCTAGCTACAACGA CGGGCAGA	4992
844	GCCCGGUU G CUCUUUCU	196	AGAAAGAG GGCTAGCTACAACGA AACCGGGC	4993
855	CUUUCUCU A UCUUCCUC	197	GAGGAAGA GGCTAGCTACAACGA AGAGAAAG	4994
867	UCCUCUUG G CUCUGCUG	198	CAGCAGAG GGCTAGCTACAACGA CAAGAGGA	4995
872	UUGGCUCU G CUGCCCUG	199	CAGGGCAG GGCTAGCTACAACGA AGAGCCAA	4996
875	GCUCUGCU G CCCUGUCU	200	AGACAGGG GGCTAGCTACAACGA AGCAGAGC	4997
880	GCUGCCCU G UCUGACCA	201	TGGTCAGA GGCTAGCTACAACGA AGGGCAGC	4998
885	CCUGUCUG A CCAUCCCA	202	TGGGATGG GGCTAGCTACAACGA CAGACAGG	4999
888	GUCUGACC A UCCCAGCC	203	GGCTGGGA GGCTAGCTACAACGA GGTCAGAC	5000
894	CCAUCCCA G CCUCCGCU	204	AGCGGAGG GGCTAGCTACAACGA TGGGATGG	5001
900	CAGCCUCC G CUUAUGAG	205	CTCATAAG GGCTAGCTACAACGA GGAGGCTG	5002
904	CUCCGCUU A UGAGGUGU	206	ACACCTCA GGCTAGCTACAACGA AAGCGGAG	5003
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911	UAUGAGGU G UGCAACGC	208	GCGTTGCA GGCTAGCTACAACGA ACCTCATA	5005
913	UGAGGUGU G CAACGCGU	209	ACGCGTTG GGCTAGCTACAACGA ACACCTCA	5006
916	GGUGUGCA A CGCGUCCG	210	CGGACGCG GGCTAGCTACAACGA TGCACACC	5007
918	UGUGCAAC G CGUCCGGG	211	CCCGGACG GGCTAGCTACAACGA GTTGCACA	5008
920	UGCAACGC G UCCGGGCU	212	AGCCCGGA GGCTAGCTACAACGA GCGTTGCA	5009
926	GCGUCCGG G CUGUACCA	213	TGGTACAG GGCTAGCTACAACGA CCGGACGC	5010
929	UCCGGGCU G UACCAUGU	214	ACATGGTA GGCTAGCTACAACGA AGCCCGGA	5011
931	CGGGCUGU A CCAUGUCA	215	TGACATGG GGCTAGCTACAACGA ACAGCCCG	5012
934	GCUGUACC A UGUCACGA	216	TCGTGACA GGCTAGCTACAACGA GGTACAGC	5013
936	UGUACCAU G UCACGAAC	217	GTTCGTGA GGCTAGCTACAACGA ATGGTACA	5014
939	ACCAUGUC A CGAACGAU	218	ATCGTTCG GGCTAGCTACAACGA GACATGGT	5015
943	UGUCACGA A CGAUUGCU	219	AGCAATCG GGCTAGCTACAACGA TCGTGACA	5016
946	CACGAACG A UUGCUCCA	220	TGGAGCAA GGCTAGCTACAACGA CGTTCGTG	5017
949	GAACGAUU G CUCCAACU	221	AGTTGGAG GGCTAGCTACAACGA AATCGTTC	5018
955	UUGCUCCA A CUCAAGCA	222	TGCTTGAG GGCTAGCTACAACGA TGGAGCAA	5019
961	CAACUCAA G CAUUGUGU	223	ACACAATG GGCTAGCTACAACGA TTGAGTTG	5020

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966	CAAGCAUU G UGUAUGAG	225	CTCATACA GGCTAGCTACAACGA AATGCTTG	5022
968	AGCAUUGU G UAUGAGGC	226	GCCTCATA GGCTAGCTACAACGA ACAATGCT	5023
970	CAUUGUGU A UGAGGCAG	227	CTGCCTCA GGCTAGCTACAACGA ACACAATG	5024
975	UGUAUGAG G CAGAGGAC	228	GTCCTCTG GGCTAGCTACAACGA CTCATACA	5025
982	GGCAGAGG A CAUGAUCA	229	TGATCATG GGCTAGCTACAACGA CCTCTGCC	5026
984	CAGAGGAC A UGAUCAUG	230	CATGATCA GGCTAGCTACAACGA GTCCTCTG	5027
987	AGGACAUG A UCAUGCAC	231	GTGCATGA GGCTAGCTACAACGA CATGTCCT	5028
990	ACAUGAUC A UGCACACC	232	GGTGTGCA GGCTAGCTACAACGA GATCATGT	5029
992	AUGAUCAU G CACACCCC	233	GGGGTGTG GGCTAGCTACAACGA ATGATCAT	5030
994	GAUCAUGC A CACCCCGG	234	CCGGGGTG GGCTAGCTACAACGA GCATGATC	5031
996	UCAUGCAC A CCCCGGGG	235	CCCCGGGG GGCTAGCTACAACGA GTGCATGA	5032
1004	ACCCCGGG G UGCGUGCC	236	GGCACGCA GGCTAGCTACAACGA CCCGGGGT	5033
1006	CCCGGGGU G CGUGCCCU	237	AGGGCACG GGCTAGCTACAACGA ACCCCGGG	5034
1008	CGGGGUGC G UGCCCUGC	238	GCAGGGCA GGCTAGCTACAACGA GCACCCCG	5035
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1015	CGUGCCCU G CGUUCGGG	240	CCCGAACG GGCTAGCTACAACGA AGGGCACG	5037
1017	UGCCCUGC G UUCGGGAG	241	CTCCCGAA GGCTAGCTACAACGA GCAGGGCA	5038
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1039	CUCCUCCC G CUGCUGGG	244	CCCAGCAG GGCTAGCTACAACGA GGGAGGAG	5041
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1050	GCUGGGUA G CGCUCACU	247	AGTGAGCG GGCTAGCTACAACGA TACCCAGC	5044
1052	UGGGUAGC G CUCACUCC	248	GGAGTGAG GGCTAGCTACAACGA GCTACCCA	5045
1056	UAGCGCUC A CUCCCACG	249	CGTGGGAG GGCTAGCTACAACGA GAGCGCTA	5046
1062	UCACUCCC A CGCUCGCG	250	CGCGAGCG GGCTAGCTACAACGA GGGAGTGA	5047
1064	ACUCCCAC G CUCGCGGC	251	GCCGCGAG GGCTAGCTACAACGA GTGGGAGT	5048
1068	CCACGCUC G CGGCCAGG	252	CCTGGCCG GGCTAGCTACAACGA GAGCGTGG	5049
1071	CGCUCGCG G CCAGGAAU	253	ATTCCTGG GGCTAGCTACAACGA CGCGAGCG	5050
1078	GGCCAGGA A UGCCAGCA	254	TGCTGGCA GGCTAGCTACAACGA TCCTGGCC	5051
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1084	GAAUGCCA G CAUCCCCA	256	TGGGGATG GGCTAGCTACAACGA TGGCATTC	5053
1086	AUGCCAGC A UCCCCACU	257	AGTGGGGA GGCTAGCTACAACGA GCTGGCAT	5054
1092	GCAUCCCC A CUACGACG	258	CGTCGTAG GGCTAGCTACAACGA GGGGATGC	5055
1095	UCCCCACU A CGACGAUA	259	TATCGTCG GGCTAGCTACAACGA AGTGGGGA	5056
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1103	ACGACGAU A CGGCGUCA	262	TGACGCCG GGCTAGCTACAACGA ATCGTCGT	5059
1106	ACGAUACG G CGUCACGU	263	ACGTGACG GGCTAGCTACAACGA CGTATCGT	5060
1108	GAUACGGC G UCACGUCG	264	CGACGTGA GGCTAGCTACAACGA GCCGTATC	5061
1111	ACGGCGUC A CGUCGAUU	265	AATCGACG GGCTAGCTACAACGA GACGCCGT	5062
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1134	UUGGGGCG G CUGCUUUC	271	GAAAGCAG GGCTAGCTACAACGA CGCCCCAA	5068
1137	GGGCGGCU G CUUUCUGC	272	GCAGAAAG GGCTAGCTACAACGA AGCCGCCC	5069
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1149	UCUGCUCU G CUAUGUAC	274	GTACATAG GGCTAGCTACAACGA AGAGCAGA	5071
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1154	UCUGCUAU G UACGUGGG	276	CCCACGTA GGCTAGCTACAACGA ATAGCAGA	5073
1156	UGCUAUGU A CGUGGGGG	277	CCCCCACG GGCTAGCTACAACGA ACATAGCA	5074
1158	CUAUGUAC G UGGGGGAU	278	ATCCCCCA GGCTAGCTACAACGA GTACATAG	5075
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1188	UCUUCCUC G UCUCUCAG	283	CTGAGAGA GGCTAGCTACAACGA GAGGAAGA	5080
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1615	CCUGAACU G CAAUGACU	392	AGTCATTG GGCTAGCTACAACGA AGTTCAGG	5189
1618	GAACUGCA A UGACUCCC	393	GGGAGTCA GGCTAGCTACAACGA TGCAGTTC	5190
1621	CUGCAAUG A CUCCCUCC	394	GGAGGGAG GGCTAGCTACAACGA CATTGCAG	5191

1632	CCCUCCAA A CCGGGUUC	395	GAACCCGG GGCTAGCTACAACGA TTGGAGGG	5192
1637	CAAACCGG G UUCAUUGC	396	GCAATGAA GGCTAGCTACAACGA CCGGTTTG	5193
1641	CCGGGUUC A UUGCUGCA	397	TGCAGCAA GGCTAGCTACAACGA GAACCCGG	5194
1644	GGUUCAUU G CUGCACUG	398	CAGTGCAG GGCTAGCTACAACGA AATGAACC	5195
1647	UCAUUGCU G CACUGUUC	399	GAACAGTG GGCTAGCTACAACGA AGCAATGA	5196
1649	AUUGCUGC A CUGUUCUA	400	TAGAACAG GGCTAGCTACAACGA GCAGCAAT	5197
1652	GCUGCACU G UUCUAUGC	401	GCATAGAA GGCTAGCTACAACGA AGTGCAGC	5198
1657	ACUGUUCU A UGCACACA	402	TGTGTGCA GGCTAGCTACAACGA AGAACAGT	5199
1659	UGUUCUAU G CACACAGG	403	CCTGTGTG GGCTAGCTACAACGA ATAGAACA	5200
1661	UUCUAUGC A CACAGGUU	404	AACCTGTG GGCTAGCTACAACGA GCATAGAA	5201
1663	CUAUGCAC A CAGGUUCA	405	TGAACCTG GGCTAGCTACAACGA GTGCATAG	5202
1667	GCACACAG G UUCAACUC	406	GAGTTGAA GGCTAGCTACAACGA CTGTGTGC	5203
1672	CAGGUUCA A CUCGUCCG	407	CGGACGAG GGCTAGCTACAACGA TGAACCTG	5204
1676	UUCAACUC G UCCGGAUG	408	CATCCGGA GGCTAGCTACAACGA GAGTTGAA	5205
1682	UCGUCCGG A UGCCCACA	409	TGTGGGCA GGCTAGCTACAACGA CCGGACGA	5206
1684	GUCCGGAU G CCCACAGC	410	GCTGTGGG GGCTAGCTACAACGA ATCCGGAC	5207
1688	GGAUGCCC A CAGCGCUU	411	AAGCGCTG GGCTAGCTACAACGA GGGCATCC	5208
1691	UGCCCACA G CGCUUGGC	412	GCCAAGCG GGCTAGCTACAACGA TGTGGGCA	5209
1693	CCCACAGC G CUUGGCCA	413	TGGCCAAG GGCTAGCTACAACGA GCTGTGGG	5210
1698	AGCGCUUG G CCAGCUGC	414	GCAGCTGG GGCTAGCTACAACGA CAAGCGCT	5211
1702	CUUGGCCA G CUGCCGCU	415	AGCGGCAG GGCTAGCTACAACGA TGGCCAAG	5212
1705	GGCCAGCU G CCGCUCCA	416	TGGAGCGG GGCTAGCTACAACGA AGCTGGCC	5213
1708	CAGCUGCC G CUCCAUUG	417	CAATGGAG GGCTAGCTACAACGA GGCAGCTG	5214
1713	GCCGCUCC A UUGACAAG	418	CTTGTCAA GGCTAGCTACAACGA GGAGCGGC	5215
1717	CUCCAUUG A CAAGUUCG	419	CGAACTTG GGCTAGCTACAACGA CAATGGAG	5216
1721	AUUGACAA G UUCGCUCA	420	TGAGCGAA GGCTAGCTACAACGA TTGTCAAT	5217
1725	ACAAGUUC G CUCAGGGG	421	CCCCTGAG GGCTAGCTACAACGA GAACTTGT	5218
1733	GCUCAGGG G UGGGGUCC	422	GGACCCCA GGCTAGCTACAACGA CCCTGAGC	5219
1738	GGGGUGGG G UCCUAUCA	423	TGATAGGA GGCTAGCTACAACGA CCCACCCC	5220
1743	GGGGUCCU A UCACCUAC	424	GTAGGTGA GGCTAGCTACAACGA AGGACCCC	5221
1746	GUCCUAUC A CCUACACC	425	GGTGTAGG GGCTAGCTACAACGA GATAGGAC	5222
1750	UAUCACCU A CACCGAGG	426	CCTCGGTG GGCTAGCTACAACGA AGGTGATA	5223
1752	UCACCUAC A CCGAGGGC	427	GCCCTCGG GGCTAGCTACAACGA GTAGGTGA	5224
1759	CACCGAGG G CCACAACU	428	AGTTGTGG GGCTAGCTACAACGA CCTCGGTG	5225
1762	CGAGGGCC A CAACUCGG	429	CCGAGTTG GGCTAGCTACAACGA GGCCCTCG	5226
1765	GGGCCACA A CUCGGACC	430	GGTCCGAG GGCTAGCTACAACGA TGTGGCCC	5227
1771	CAACUCGG A CCAGAGGC	431	GCCTCTGG GGCTAGCTACAACGA CCGAGTTG	5228
1778	GACCAGAG G CCCUAUUG	432	CAATAGGG GGCTAGCTACAACGA CTCTGGTC	5229
1783	GAGGCCCU A UUGCUGGC	433	GCCAGCAA GGCTAGCTACAACGA AGGGCCTC	5230
1786	GCCCUAUU G CUGGCACU	434	AGTGCCAG GGCTAGCTACAACGA AATAGGGC	5231
1790	UAUUGCUG G CACUACGC	435	GCGTAGTG GGCTAGCTACAACGA CAGCAATA	5232
1792	UUGCUGGC A CUACGCAC	436	GTGCGTAG GGCTAGCTACAACGA GCCAGCAA	5233
1795	CUGGCACU A CGCACCGC	437	GCGGTGCG GGCTAGCTACAACGA AGTGCCAG	5234
1797	GGCACUAC G CACCGCGG	438	CCGCGGTG GGCTAGCTACAACGA GTAGTGCC	5235
1799	CACUACGC A CCGCGGCC	439	GGCCGCGG GGCTAGCTACAACGA GCGTAGTG	5236
1802	UACGCACC G CGGCCGUG	440	CACGGCCG GGCTAGCTACAACGA GGTGCGTA	5237
1805	GCACCGCG G CCGUGUGG	441	CCACACGG GGCTAGCTACAACGA CGCGGTGC	5238
1808	CCGCGGCC G UGUGGUAU	442	ATACCACA GGCTAGCTACAACGA GGCCGCGG	5239
1810	GCGGCCGU G UGGUAUCG	443	CGATACCA GGCTAGCTACAACGA ACGGCCGC	5240
1813	GCCGUGUG G UAUCGUAC	444	GTACGATA GGCTAGCTACAACGA CACACGGC	5241
1815	CGUGUGGU A UCGUACCC	445	GGGTACGA GGCTAGCTACAACGA ACCACACG	5242
1818	GUGGUAUC G UACCCGCA	446	TGCGGGTA GGCTAGCTACAACGA GATACCAC	5243
1820	GGUAUCGU A CCCGCAUC	447	GATGCGGG GGCTAGCTACAACGA ACGATACC	5244
1824	UCGUACCC G CAUCGCAG	448	CTGCGATG GGCTAGCTACAACGA GGGTACGA	5245
1826	GUACCCGC A UCGCAGGU	449	ACCTGCGA GGCTAGCTACAACGA GCGGGTAC	5246
1829	CCCGCAUC G CAGGUAUG	450	CATACCTG GGCTAGCTACAACGA GATGCGGG	5247
1833	CAUCGCAG G UAUGUGGU	451	ACCACATA GGCTAGCTACAACGA CTGCGATG	5248

1835	UCGCAGGU A UGUGGUCC	452	GGACCACA GGCTAGCTACAACGA ACCTGCGA	5249
1837	GCAGGUAU G UGGUCCAG	453	CTGGACCA GGCTAGCTACAACGA ATACCTGC	5250
1840	GGUAUGUG G UCCAGUGU	454	ACACTGGA GGCTAGCTACAACGA CACATACC	5251
1845	GUGGUCCA G UGUAUUGC	455	GCAATACA GGCTAGCTACAACGA TGGACCAC	5252
1847	GGUCCAGU G UAUUGCUU	456	AAGCAATA GGCTAGCTACAACGA ACTGGACC	5253
1849	UCCAGUGU A UUGCUUCA	457	TGAAGCAA GGCTAGCTACAACGA ACACTGGA	5254
1852	AGUGUAUU G CUUCACCC	458	GGGTGAAG GGCTAGCTACAACGA AATACACT	5255
1857	AUUGCUUC A CCCCAAGC	459	GCTTGGGG GGCTAGCTACAACGA GAAGCAAT	5256
1864	CACCCCAA G CCCUGUUG	460	CAACAGGG GGCTAGCTACAACGA TTGGGGTG	5257
1869	CAAGCCCU G UUGUGGUG	461	CACCACAA GGCTAGCTACAACGA AGGGCTTG	5258
1872	GCCCUGUU G UGGUGGGG	462	CCCCACCA GGCTAGCTACAACGA AACAGGGC	5259
1875	CUGUUGUG G UGGGGACG	463	CGTCCCCA GGCTAGCTACAACGA CACAACAG	5260
1881	UGGUGGGG A CGACCGAC	464	GTCGGTCG GGCTAGCTACAACGA CCCCACCA	5261
1884	UGGGGACG A CCGACCGU	465	ACGGTCGG GGCTAGCTACAACGA CGTCCCCA	5262
1888	GACGACCG A CCGUUUCG	466	CGAAACGG GGCTAGCTACAACGA CGGTCGTC	5263
1891	GACCGACC G UUUCGGCG	467	CGCCGAAA GGCTAGCTACAACGA GGTCGGTC	5264
1897	CCGUUUCG G CGCCCCCA	468	TGGGGGCG GGCTAGCTACAACGA CGAAACGG	5265
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1905	GCGCCCCC A CGUAUAAC	470	GTTATACG GGCTAGCTACAACGA GGGGGCGC	5267
1907	GCCCCCAC G UAUAACUG	471	CAGTTATA GGCTAGCTACAACGA GTGGGGGC	5268
1909	CCCCACGU A UAACUGGG	472	CCCAGTTA GGCTAGCTACAACGA ACGTGGGG	5269
1912	CACGUAUA A CUGGGGGG	473	CCCCCCAG GGCTAGCTACAACGA TATACGTG	5270
1920	ACUGGGGG G CGAACGAG	474	CTCGTTCG GGCTAGCTACAACGA CCCCCAGT	5271
1924	GGGGGCGA A CGAGACGG	475	CCGTCTCG GGCTAGCTACAACGA TCGCCCCC	5272
1929	CGAACGAG A CGGACGUG	476	CACGTCCG GGCTAGCTACAACGA CTCGTTCG	5273
1933	CGAGACGG A CGUGCUGC	477	GCAGCACG GGCTAGCTACAACGA CCGTCTCG	5274
1935	AGACGGAC G UGCUGCUC	478	GAGCAGCA GGCTAGCTACAACGA GTCCGTCT	5275
1937	ACGGACGU G CUGCUCCU	479	AGGAGCAG GGCTAGCTACAACGA ACGTCCGT	5276
1940	GACGUGCU G CUCCUCAA	480	TTGAGGAG GGCTAGCTACAACGA AGCACGTC	5277
1948	GCUCCUCA A CAACACGC	481	GCGTGTTG GGCTAGCTACAACGA TGAGGAGC	5278
1951	CCUCAACA A CACGCGGC	482	GCCGCGTG GGCTAGCTACAACGA TGTTGAGG	5279
1953	UCAACAAC A CGCGGCCG	483	CGGCCGCG GGCTAGCTACAACGA GTTGTTGA	5280
1955	AACAACAC G CGGCCGCC	484	GGCGGCCG GGCTAGCTACAACGA GTGTTGTT	5281
1958	AACACGCG G CCGCCGCA	485	TGCGGCGG GGCTAGCTACAACGA CGCGTGTT	5282
1961	ACGCGGCC G CCGCAAGG	486	CCTTGCGG GGCTAGCTACAACGA GGCCGCGT	5283
1964	CGGCCGCC G CAAGGCAA	487	TTGCCTTG GGCTAGCTACAACGA GGCGGCCG	5284
1969	GCCGCAAG G CAACUGGU	488	ACCAGTTG GGCTAGCTACAACGA CTTGCGGC	5285
1972	GCAAGGCA A CUGGUUCG	489	CGAACCAG GGCTAGCTACAACGA TGCCTTGC	5286
1976	GGCAACUG G UUCGGCUG	490	CAGCCGAA GGCTAGCTACAACGA CAGTTGCC	5287
1981	CUGGUUCG G CUGCACAU	491	ATGTGCAG GGCTAGCTACAACGA CGAACCAG	5288
1984	GUUCGGCU G CACAUGGA	492	TCCATGTG GGCTAGCTACAACGA AGCCGAAC	5289
1986	UCGGCUGC A CAUGGAUG	493	CATCCATG GGCTAGCTACAACGA GCAGCCGA	5290
1988	GGCUGCAC A UGGAUGAA	494	TTCATCCA GGCTAGCTACAACGA GTGCAGCC	5291
1992	GCACAUGG A UGAAUGGC	495	GCCATTCA GGCTAGCTACAACGA CCATGTGC	5292
1996	AUGGAUGA A UGGCACUG	496	CAGTGCCA GGCTAGCTACAACGA TCATCCAT	5293
1999	GAUGAAUG G CACUGGGU	497	ACCCAGTG GGCTAGCTACAACGA CATTCATC	5294
2001	UGAAUGGC A CUGGGUUC	498	GAACCCAG GGCTAGCTACAACGA GCCATTCA	5295
2006	GGCACUGG G UUCACCAA	499	TTGGTGAA GGCTAGCTACAACGA CCAGTGCC	5296
2010	CUGGGUUC A CCAAGACG	500	CGTCTTGG GGCTAGCTACAACGA GAACCCAG	5297
2016	UCACCAAG A CGUGCGGG	501	CCCGCACG GGCTAGCTACAACGA CTTGGTGA	5298
2018	ACCAAGAC G UGCGGGGG	502	CCCCCGCA GGCTAGCTACAACGA GTCTTGGT	5299
2020	CAAGACGU G CGGGGGCC	503	GGCCCCCG GGCTAGCTACAACGA ACGTCTTG	5300
2026	GUGCGGGG G CCCCCCGU	504	ACGGGGGG GGCTAGCTACAACGA CCCCGCAC	5301
2033	GGCCCCCC G UGCAACAU	505	ATGTTGCA GGCTAGCTACAACGA GGGGGGCC	5302
2035	CCCCCCGU G CAACAUCG	506	CGATGTTG GGCTAGCTACAACGA ACGGGGGG	5303
2038	CCCGUGCA A CAUCGGGG	507	CCCCGATG GGCTAGCTACAACGA TGCACGGG	5304
2040	CGUGCAAC A UCGGGGGG	508	CCCCCCGA GGCTAGCTACAACGA GTTGCACG	5305

2049	UCGGGGGG G CCGGUAAC	509	GTTACCGG GGCTAGCTACAACGA CCCCCCGA	5306
2053	GGGGGCCG G UAACGACA	510	TGTCGTTA GGCTAGCTACAACGA CGGCCCCC	5307
2056	GGCCGGUA A CGACACCU	511	AGGTGTCG GGCTAGCTACAACGA TACCGGCC	5308
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2061	GUAACGAC A CCUUAACC	513	GGTTAAGG GGCTAGCTACAACGA GTCGTTAC	5310
2067	ACACCUUA A CCUGCCCC	514	GGGGCAGG GGCTAGCTACAACGA TAAGGTGT	5311
2071	CUUAACCU G CCCCACGG	515	CCGTGGGG GGCTAGCTACAACGA AGGTTAAG	5312
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2080	CCCCACGG A CUGCUUCC	517	GGAAGCAG GGCTAGCTACAACGA CCGTGGGG	5314
2083	CACGGACU G CUUCCGGA	518	TCCGGAAG GGCTAGCTACAACGA AGTCCGTG	5315
2093	UUCCGGAA G CACCCCGA	519	TCGGGGTG GGCTAGCTACAACGA TTCCGGAA	5316
2095	CCGGAAGC A CCCCGAGG	520	CCTCGGGG GGCTAGCTACAACGA GCTTCCGG	5317
2103	ACCCCGAG G CCACUUAC	521	GTAAGTGG GGCTAGCTACAACGA CTCGGGGT	5318
2106	CCGAGGCC A CUUACGCA	522	TGCGTAAG GGCTAGCTACAACGA GGCCTCGG	5319
2110	GGCCACUU A CGCAAAGU	523	ACTTTGCG GGCTAGCTACAACGA AAGTGGCC	5320
2112	CCACUUAC G CAAAGUGC	524	GCACTTTG GGCTAGCTACAACGA GTAAGTGG	5321
2117	UACGCAAA G UGCGGUUC	525	GAACCGCA GGCTAGCTACAACGA TTTGCGTA	5322
2119	CGCAAAGU G CGGUUCGG	526	CCGAACCG GGCTAGCTACAACGA ACTTTGCG	5323
2122	AAAGUGCG G UUCGGGGC	527	GCCCCGAA GGCTAGCTACAACGA CGCACTTT	5324
2129	GGUUCGGG G CCUUGGUU	528	AACCAAGG GGCTAGCTACAACGA CCCGAACC	5325
2135	GGGCCUUG G UUAACACC	529	GGTGTTAA GGCTAGCTACAACGA CAAGGCCC	5326
2139	CUUGGUUA A CACCUAGA	530	TCTAGGTG GGCTAGCTACAACGA TAACCAAG	5327
2141	UGGUUAAC A CCUAGAUG	531	CATCTAGG GGCTAGCTACAACGA GTTAACCA	5328
2147	ACACCUAG A UGCAUAGU	532	ACTATGCA GGCTAGCTACAACGA CTAGGTGT	5329
2149	ACCUAGAU G CAUAGUUG	533	CAACTATG GGCTAGCTACAACGA ATCTAGGT	5330
2151	CUAGAUGC A UAGUUGAC	534	GTCAACTA GGCTAGCTACAACGA GCATCTAG	5331
2154	GAUGCAUA G UUGACUAC	535	GTAGTCAA GGCTAGCTACAACGA TATGCATC	5332
2158	CAUAGUUG A CUACCCAU	536	ATGGGTAG GGCTAGCTACAACGA CAACTATG	5333
2161	AGUUGACU A CCCAUACA	537	TGTATGGG GGCTAGCTACAACGA AGTCAACT	5334
2165	GACUACCC A UACAGGCU	538	AGCCTGTA GGCTAGCTACAACGA GGGTAGTC	5335
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2171	CCAUACAG G CUUUGGCA	540	TGCCAAAG GGCTAGCTACAACGA CTGTATGG	5337
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2179	GCUUUGGC A CUACCCCU	542	AGGGGTAG GGCTAGCTACAACGA GCCAAAGC	5339
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2188	CUACCCCU G CACUGUCA	544	TGACAGTG GGCTAGCTACAACGA AGGGGTAG	5341
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2193	CCUGCACU G UCAAUUUU	546	AAAATTGA GGCTAGCTACAACGA AGTGCAGG	5343
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2214	UCUUUAAG G UUAGGAUG	549	CATCCTAA GGCTAGCTACAACGA CTTAAAGA	5346
2220	AGGUUAGG A UGUAUGUG	550	CACATACA GGCTAGCTACAACGA CCTAACCT	5347
2222	GUUAGGAU G UAUGUGGG	551	CCCACATA GGCTAGCTACAACGA ATCCTAAC	5348
2224	UAGGAUGU A UGUGGGGG	552	CCCCCACA GGCTAGCTACAACGA ACATCCTA	5349
2226	GGAUGUAU G UGGGGGGC	553	GCCCCCCA GGCTAGCTACAACGA ATACATCC	5350
2233	UGUGGGGG G CGUGGAGC	554	GCTCCACG GGCTAGCTACAACGA CCCCCACA	5351
2235	UGGGGGGC G UGGAGCAC	555	GTGCTCCA GGCTAGCTACAACGA GCCCCCCA	5352
2240	GGCGUGGA G CACAGGCU	556	AGCCTGTG GGCTAGCTACAACGA TCCACGCC	5353
2242	CGUGGAGC A CAGGCUCA	557	TGAGCCTG GGCTAGCTACAACGA GCTCCACG	5354
2246	GAGCACAG G CUCACCGC	558	GCGGTGAG GGCTAGCTACAACGA CTGTGCTC	5355
2250	ACAGGCUC A CCGCCGCA	559	TGCGGCGG GGCTAGCTACAACGA GAGCCTGT	5356
2253	GGCUCACC G CCGCAUGC	560	GCATGCGG GGCTAGCTACAACGA GGTGAGCC	5357
2256	UCACCGCC G CAUGCAAU	561	ATTGCATG GGCTAGCTACAACGA GGCGGTGA	5358
2258	ACCGCCGC A UGCAAUUG	562	CAATTGCA GGCTAGCTACAACGA GCGGCGGT	5359
2260	CGCCGCAU G CAAUUGGA	563	TCCAATTG GGCTAGCTACAACGA ATGCGGCG	5360
2263	CGCAUGCA A UUGGACUC	564	GAGTCCAA GGCTAGCTACAACGA TGCATGCG	5361
2268	GCAAUUGG A CUCGAGGA	565	TCCTCGAG GGCTAGCTACAACGA CCAATTGC	5362

2279	CGAGGAGA G CGUUGUGA	566	TCACAACG GGCTAGCTACAACGA TCTCCTCG	5363
2281	AGGAGAGC G UUGUGAUU	567	AATCACAA GGCTAGCTACAACGA GCTCTCCT	5364
2284	AGAGCGUU G UGAUUUGG	568	CCAAATCA GGCTAGCTACAACGA AACGCTCT	5365
2287	GCGUUGUG A UUUGGAGG	569	CCTCCAAA GGCTAGCTACAACGA CACAACGC	5366
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2306	AGGGACAG A UCAGAGCU	572	AGCTCTGA GGCTAGCTACAACGA CTGTCCCT	5369
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2317	AGAGCUCA G CCCGCUGC	574	GCAGCGGG GGCTAGCTACAACGA TGAGCTCT	5371
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2324	AGCCCGCU G CUGUUGUC	576	GACAACAG GGCTAGCTACAACGA AGCGGGCT	5373
2327	CCGCUGCU G UUGUCCAC	577	GTGGACAA GGCTAGCTACAACGA AGCAGCGG	5374
2330	CUGCUGUU G UCCACUAC	578	GTAGTGGA GGCTAGCTACAACGA AACAGCAG	5375
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2337	UGUCCACU A CAGAGUGG	580	CCACTCTG GGCTAGCTACAACGA AGTGGACA	5377
2342	ACUACAGA G UGGCAAAU	581	ATTTGCCA GGCTAGCTACAACGA TCTGTAGT	5378
2345	ACAGAGUG G CAAAUACU	582	AGTATTTG GGCTAGCTACAACGA CACTCTGT	5379
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2351	UGGCAAAU A CUGCCCUG	584	CAGGGCAG GGCTAGCTACAACGA ATTTGCCA	5381
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2375	ACCACCCU A CCGGCUCU	589	AGAGCCGG GGCTAGCTACAACGA AGGGTGGT	5386
2379	CCCUACCG G CUCUGUCC	590	GGACAGAG GGCTAGCTACAACGA CGGTAGGG	5387
2384	CCGGCUCU G UCCACUGG	591	CCAGTGGA GGCTAGCTACAACGA AGAGCCGG	5388
2388	CUCUGUCC A CUGGUUUG	592	CAAACCAG GGCTAGCTACAACGA GGACAGAG	5389
2392	GUCCACUG G UUUGAUCC	593	GGATCAAA GGCTAGCTACAACGA CAGTGGAC	5390
2397	CUGGUUUG A UCCAUCUC	594	GAGATGGA GGCTAGCTACAACGA CAAACCAG	5391
2401	UUUGAUCC A UCUCCACC	595	GGTGGAGA GGCTAGCTACAACGA GGATCAAA	5392
2407	CCAUCUCC A CCAGAACA	596	TGTTCTGG GGCTAGCTACAACGA GGAGATGG	5393
2413	CCACCAGA A CAUCGUGG	597	CCACGATG GGCTAGCTACAACGA TCTGGTGG	5394
2415	ACCAGAAC A UCGUGGAC	598	GTCCACGA GGCTAGCTACAACGA GTTCTGGT	5395
2418	AGAACAUC G UGGACGUG	599	CACGTCCA GGCTAGCTACAACGA GATGTTCT	5396
2422	CAUCGUGG A CGUGCAAU	600	ATTGCACG GGCTAGCTACAACGA CCACGATG	5397
2424	UCGUGGAC G UGCAAUAC	601	GTATTGCA GGCTAGCTACAACGA GTCCACGA	5398
2426	GUGGACGU G CAAUACCU	602	AGGTATTG GGCTAGCTACAACGA ACGTCCAC	5399
2429	GACGUGCA A UACCUGUA	603	TACAGGTA GGCTAGCTACAACGA TGCACGTC	5400
2431	CGUGCAAU A CCUGUACG	604	CGTACAGG GGCTAGCTACAACGA ATTGCACG	5401
2435	CAAUACCU G UACGGUGU	605	ACACCGTA GGCTAGCTACAACGA AGGTATTG	5402
2437	AUACCUGU A CGGUGUAG	606	CTACACCG GGCTAGCTACAACGA ACAGGTAT	5403
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2447	GGUGUAGG G UCAGCGGU	609	ACCGCTGA GGCTAGCTACAACGA CCTACACC	5406
2451	UAGGGUCA G CGGUUGUC	610	GACAACCG GGCTAGCTACAACGA TGACCCTA	5407
2454	GGUCAGCG G UUGUCUCC	611	GGAGACAA GGCTAGCTACAACGA CGCTGACC	5408
2457	CAGCGGUU G UCUCCUUC	612	GAAGGAGA GGCTAGCTACAACGA AACCGCTG	5409
2466	UCUCCUUC G CAAUCAAA	613	TTTGATTG GGCTAGCTACAACGA GAAGGAGA	5410
2469	CCUUCGCA A UCAAAUGG	614	CCATTTGA GGCTAGCTACAACGA TGCGAAGG	5411
2474	GCAAUCAA A UGGGAGUA	615	TACTCCCA GGCTAGCTACAACGA TTGATTGC	5412
2480	AAAUGGGA G UAUGUCCU	616	AGGACATA GGCTAGCTACAACGA TCCCATTT	5413
2482	AUGGGAGU A UGUCCUGU	617	ACAGGACA GGCTAGCTACAACGA ACTCCCAT	5414
2484	GGGAGUAU G UCCUGUUG	618	CAACAGGA GGCTAGCTACAACGA ATACTCCC	5415
2489	UAUGUCCU G UUGCUUUU	619	AAAAGCAA GGCTAGCTACAACGA AGGACATA	5416
2492	GUCCUGUU G CUUUUCCU	620	AGGAAAAG GGCTAGCTACAACGA AACAGGAC	5417
2508	UUCUCCUG G CAGACGCG	621	CGCGTCTG GGCTAGCTACAACGA CAGGAGAA	5418
2512	CCUGGCAG A CGCGCGCG	622	CGCGCGCG GGCTAGCTACAACGA CTGCCAGG	5419

2514	UGGCAGAC G CGCGCGUC	623	GACGCGCG GGCTAGCTACAACGA GTCTGCCA	5420
2516	GCAGACGC G CGCGUCUG	624	CAGACGCG GGCTAGCTACAACGA GCGTCTGC	5421
2518	AGACGCGC G CGUCUGUG	625	CACAGACG GGCTAGCTACAACGA GCGCGTCT	5422
2520	ACGCGCGC G UCUGUGCC	626	GGCACAGA GGCTAGCTACAACGA GCGCGCGT	5423
2524	GCGCGUCU G UGCCUGUU	627	AACAGGCA GGCTAGCTACAACGA AGACGCGC	5424
2526	GCGUCUGU G CCUGUUUG	628	CAAACAGG GGCTAGCTACAACGA ACAGACGC	5425
2530	CUGUGCCU G UUUGUGGA	629	TCCACAAA GGCTAGCTACAACGA AGGCACAG	5426
2534	GCCUGUUU G UGGAUGAU	630	ATCATCCA GGCTAGCTACAACGA AAACAGGC	5427
2538	GUUUGUGG A UGAUGCUG	631	CAGCATCA GGCTAGCTACAACGA CCACAAAC	5428
2541	UGUGGAUG A UGCUGUUG	632	CAACAGCA GGCTAGCTACAACGA CATCCACA	5429
2543	UGGAUGAU G CUGUUGGU	633	ACCAACAG GGCTAGCTACAACGA ATCATCCA	5430
2546	AUGAUGCU G UUGGUAGC	634	GCTACCAA GGCTAGCTACAACGA AGCATCAT	5431
2550	UGCUGUUG G UAGCCCAG	635	CTGGGCTA GGCTAGCTACAACGA CAACAGCA	5432
2553	UGUUGGUA G CCCAGGCC	636	GGCCTGGG GGCTAGCTACAACGA TACCAACA	5433
2559	UAGCCCAG G CCGAGGCU	637	AGCCTCGG GGCTAGCTACAACGA CTGGGCTA	5434
2565	AGGCCGAG G CUGCCCUA	638	TAGGGCAG GGCTAGCTACAACGA CTCGGCCT	5435
2568	CCGAGGCU G CCCUAGAG	639	CTCTAGGG GGCTAGCTACAACGA AGCCTCGG	5436
2578	CCUAGAGA A CCUGGUGG	640	CCACCAGG GGCTAGCTACAACGA TCTCTAGG	5437
2583	AGAACCUG G UGGUCCUC	641	GAGGACCA GGCTAGCTACAACGA CAGGTTCT	5438
2586	ACCUGGUG G UCCUCAAU	642	ATTGAGGA GGCTAGCTACAACGA CACCAGGT	5439
2593	GGUCCUCA A UGCAGCAU	643	ATGCTGCA GGCTAGCTACAACGA TGAGGACC	5440
2595	UCCUCAAU G CAGCAUCC	644	GGATGCTG GGCTAGCTACAACGA ATTGAGGA	5441
2598	UCAAUGCA G CAUCCUUG	645	CAAGGATG GGCTAGCTACAACGA TGCATTGA	5442
2600	AAUGCAGC A UCCUUGGC	646	GCCAAGGA GGCTAGCTACAACGA GCTGCATT	5443
2607	CAUCCUUG G CCGGAGUG	647	CACTCCGG GGCTAGCTACAACGA CAAGGATG	5444
2613	UGGCCGGA G UGCAUGGC	648	GCCATGCA GGCTAGCTACAACGA TCCGGCCA	5445
2615	GCCGGAGU G CAUGGCAU	649	ATGCCATG GGCTAGCTACAACGA ACTCCGGC	5446
2617	CGGAGUGC A UGGCAUCC	650	GGATGCCA GGCTAGCTACAACGA GCACTCCG	5447
2620	AGUGCAUG G CAUCCUCU	651	AGAGGATG GGCTAGCTACAACGA CATGCACT	5448
2622	UGCAUGGC A UCCUCUCC	652	GGAGAGGA GGCTAGCTACAACGA GCCATGCA	5449
2637	CCUUCCUC G UGUUCUUC	653	GAAGAACA GGCTAGCTACAACGA GAGGAAGG	5450
2639	UUCCUCGU G UUCUUCUG	654	CAGAAGAA GGCTAGCTACAACGA ACGAGGAA	5451
2647	GUUCUUCU G UGCUGCCU	655	AGGCAGCA GGCTAGCTACAACGA AGAAGAAC	5452
2649	UCUUCUGU G CUGCCUGG	656	CCAGGCAG GGCTAGCTACAACGA ACAGAAGA	5453
2652	UCUGUGCU G CCUGGUAC	657	GTACCAGG GGCTAGCTACAACGA AGCACAGA	5454
2657	GCUGCCUG G UACAUCAA	658	TTGATGTA GGCTAGCTACAACGA CAGGCAGC	5455
2659	UGCCUGGU A CAUCAAAG	659	CTTTGATG GGCTAGCTACAACGA ACCAGGCA	5456
2661	CCUGGUAC A UCAAAGGC	660	GCCTTTGA GGCTAGCTACAACGA GTACCAGG	5457
2668	CAUCAAAG G CAAGCUGG	661	CCAGCTTG GGCTAGCTACAACGA CTTTGATG	5458
2672	AAAGGCAA G CUGGUCCC	662	GGGACCAG GGCTAGCTACAACGA TTGCCTTT	5459
2676	GCAAGCUG G UCCCUGGG	663	CCCAGGGA GGCTAGCTACAACGA CAGCTTGC	5460
2685	UCCCUGGG G CGGCAUAU	664	ATATGCCG GGCTAGCTACAACGA CCCAGGGA	5461
2688	CUGGGGCG G CAUAUGCU	665	AGCATATG GGCTAGCTACAACGA CGCCCCAG	5462
2690	GGGGCGGC A UAUGCUCU	666	AGAGCATA GGCTAGCTACAACGA GCCGCCCC	5463
2692	GGCGGCAU A UGCUCUCU	667	AGAGAGCA GGCTAGCTACAACGA ATGCCGCC	5464
2694	CGGCAUAU G CUCUCUAC	668	GTAGAGAG GGCTAGCTACAACGA ATATGCCG	5465
2701	UGCUCUCU A CGGCGUAU	669	ATACGCCG GGCTAGCTACAACGA AGAGAGCA	5466
2704	UCUCUACG G CGUAUGGC	670	GCCATACG GGCTAGCTACAACGA CGTAGAGA	5467
2706	UCUACGGC G UAUGGCCG	671	CGGCCATA GGCTAGCTACAACGA GCCGTAGA	5468
2708	UACGGCGU A UGGCCGCU	672	AGCGGCCA GGCTAGCTACAACGA ACGCCGTA	5469
2711	GGCGUAUG G CCGCUACU	673	AGTAGCGG GGCTAGCTACAACGA CATACGCC	5470
2714	GUAUGGCC G CUACUCCU	674	AGGAGTAG GGCTAGCTACAACGA GGCCATAC	5471
2717	UGGCCGCU A CUCCUGCU	675	AGCAGGAG GGCTAGCTACAACGA AGCGGCCA	5472
2723	CUACUCCU G CUCCUGCU	676	AGCAGGAG GGCTAGCTACAACGA AGGAGTAG	5473
2729	CUGCUCCU G CUGGCGUU	677	AACGCCAG GGCTAGCTACAACGA AGGAGCAG	5474
2733	UCCUGCUG G CGUUACCA	678	TGGTAACG GGCTAGCTACAACGA CAGCAGGA	5475
2735	CUGCUGGC G UUACCACC	679	GGTGGTAA GGCTAGCTACAACGA GCCAGCAG	5476

2738	CUGGCGUU A CCACCACG	680	CGTGGTGG GGCTAGCTACAACGA AACGCCAG	5477
2741	GCGUUACC A CCACGGGC	681	GCCCGTGG GGCTAGCTACAACGA GGTAACGC	5478
2744	UUACCACC A CGGGCGUA	682	TACGCCCG GGCTAGCTACAACGA GGTGGTAA	5479
2748	CACCACGG G CGUACGCC	683	GGCGTACG GGCTAGCTACAACGA CCGTGGTG	5480
2750	CCACGGGC G UACGCCAU	684	ATGGCGTA GGCTAGCTACAACGA GCCCGTGG	5481
2752	ACGGGCGU A CGCCAUGG	685	CCATGGCG GGCTAGCTACAACGA ACGCCCGT	5482
2754	GGGCGUAC G CCAUGGAC	686	GTCCATGG GGCTAGCTACAACGA GTACGCCC	5483
2757	CGUACGCC A UGGACCGG	687	CCGGTCCA GGCTAGCTACAACGA GGCGTACG	5484
2761	CGCCAUGG A CCGGGAGA	688	TCTCCCGG GGCTAGCTACAACGA CCATGGCG	5485
2769	ACCGGGAG A UGGCCGCA	689	TGCGGCCA GGCTAGCTACAACGA CTCCCGGT	5486
2772	GGGAGAUG G CCGCAUCG	690	CGATGCGG GGCTAGCTACAACGA CATCTCCC	5487
2775	AGAUGGCC G CAUCGUGC	691	GCACGATG GGCTAGCTACAACGA GGCCATCT	5488
2777	AUGGCCGC A UCGUGCGG	692	CCGCACGA GGCTAGCTACAACGA GCGGCCAT	5489
2780	GCCGCAUC G UGCGGAGG	693	CCTCCGCA GGCTAGCTACAACGA GATGCGGC	5490
2782	CGCAUCGU G CGGAGGCG	694	CGCCTCCG GGCTAGCTACAACGA ACGATGCG	5491
2788	GUGCGGAG G CGUGGUUU	695	AAACCACG GGCTAGCTACAACGA CTCCGCAC	5492
2790	GCGGAGGC G UGGUUUUU	696	AAAAACCA GGCTAGCTACAACGA GCCTCCGC	5493
2793	GAGGCGUG G UUUUUGUA	697	TACAAAAA GGCTAGCTACAACGA CACGCCTC	5494
2799	UGGUUUUU G UAGGUCUA	698	TAGACCTA GGCTAGCTACAACGA AAAAACCA	5495
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2810	GGUCUAGC A CUCUUGAC	701	GTCAAGAG GGCTAGCTACAACGA GCTAGACC	5498
2817	CACUCUUG A CCUUGUCA	702	TGACAAGG GGCTAGCTACAACGA CAAGAGTG	5499
2822	UUGACCUU G UCACCAUA	703	TATGGTGA GGCTAGCTACAACGA AAGGTCAA	5500
2825	ACCUUGUC A CCAUACUA	704	TAGTATGG GGCTAGCTACAACGA GACAAGGT	5501
2828	UUGUCACC A UACUACAA	705	TTGTAGTA GGCTAGCTACAACGA GGTGACAA	5502
2830	GUCACCAU A CUACAAAG	706	CTTTGTAG GGCTAGCTACAACGA ATGGTGAC	5503
2833	ACCAUACU A CAAAGUGU	707	ACACTTTG GGCTAGCTACAACGA AGTATGGT	5504
2838	ACUACAAA G UGUUCCUC	708	GAGGAACA GGCTAGCTACAACGA TTTGTAGT	5505
2840	UACAAAGU G UUCCUCGC	709	GCGAGGAA GGCTAGCTACAACGA ACTTTGTA	5506
2847	UGUUCCUC G CUAGGCUC	710	GAGCCTAG GGCTAGCTACAACGA GAGGAACA	5507
2852	CUCGCUAG G CUCAUAUG	711	CATATGAG GGCTAGCTACAACGA CTAGCGAG	5508
2856	CUAGGCUC A UAUGGUGG	712	CCACCATA GGCTAGCTACAACGA GAGCCTAG	5509
2858	AGGCUCAU A UGGUGGUU	713	AACCACCA GGCTAGCTACAACGA ATGAGCCT	5510
2861	CUCAUAUG G UGGUUGCA	714	TGCAACCA GGCTAGCTACAACGA CATATGAG	5511
2864	AUAUGGUG G UUGCAAUA	715	TATTGCAA GGCTAGCTACAACGA CACCATAT	5512
2867	UGGUGGUU G CAAUACCU	716	AGGTATTG GGCTAGCTACAACGA AACCACCA	5513
2870	UGGUUGCA A UACCUUAU	717	ATAAGGTA GGCTAGCTACAACGA TGCAACCA	5514
2872	GUUGCAAU A CCUUAUCA	718	TGATAAGG GGCTAGCTACAACGA ATTGCAAC	5515
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2880	ACCUUAUC A CCAGAGCC	720	GGCTCTGG GGCTAGCTACAACGA GATAAGGT	5517
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2892	GAGCCGAG G CGCAGUUG	722	CAACTGCG GGCTAGCTACAACGA CTCGGCTC	5519
2894	GCCGAGGC G CAGUUGCA	723	TGCAACTG GGCTAGCTACAACGA GCCTCGGC	5520
2897	GAGGCGCA G UUGCAAGU	724	ACTTGCAA GGCTAGCTACAACGA TGCGCCTC	5521
2900	GCGCAGUU G CAAGUGUG	725	CACACTTG GGCTAGCTACAACGA AACTGCGC	5522
2904	AGUUGCAA G UGUGGAUC	726	GATCCACA GGCTAGCTACAACGA TTGCAACT	5523
2906	UUGCAAGU G UGGAUCCC	727	GGGATCCA GGCTAGCTACAACGA ACTTGCAA	5524
2910	AAGUGUGG A UCCCCCCC	728	GGGGGGGA GGCTAGCTACAACGA CCACACTT	5525
2923	CCCCCUCA A CGUUCGGG	729	CCCGAACG GGCTAGCTACAACGA TGAGGGGG	5526
2925	CCCUCAAC G UUCGGGGG	730	CCCCCGAA GGCTAGCTACAACGA GTTGAGGG	5527
2936	CGGGGGGG G CGCGGUGC	731	GCACCGCG GGCTAGCTACAACGA CCCCCCCG	5528
2938	GGGGGGGC G CGGUGCCA	732	TGGCACCG GGCTAGCTACAACGA GCCCCCCC	5529
2941	GGGGCGCG G UGCCAUCA	733	TGATGGCA GGCTAGCTACAACGA CGCGCCCC	5530
2943	GGCGCGGU G CCAUCAUU	734	AATGATGG GGCTAGCTACAACGA ACCGCGCC	5531
2946	GCGGUGCC A UCAUUCUC	735	GAGAATGA GGCTAGCTACAACGA GGCACCGC	5532
2949	GUGCCAUC A UUCUCCUC	736	GAGGAGAA GGCTAGCTACAACGA GATGGCAC	5533

2958	UUCUCCUC A CGUGUGUG	737	CACACACG GGCTAGCTACAACGA GAGGAGAA	5534
2960	CUCCUCAC G UGUGUGGU	738	ACCACACA GGCTAGCTACAACGA GTGAGGAG	5535
2962	CCUCACGU G UGUGGUCC	739	GGACCACA GGCTAGCTACAACGA ACGTGAGG	5536
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2971	UGUGGUCC A CCCAGAGC	742	GCTCTGGG GGCTAGCTACAACGA GGACCACA	5539
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2994	UUGACAUC A CCAAAAUU	747	AATTTTGG GGCTAGCTACAACGA GATGTCAA	5544
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3005	AAAAUUAU G CUCGCCAU	750	ATGGCGAG GGCTAGCTACAACGA ATAATTTT	5547
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3014	CUCGCCAU A CUCGGCCC	753	GGGCCGAG GGCTAGCTACAACGA ATGGCGAG	5550
3019	CAUACUCG G CCCGCUCA	754	TGAGCGGG GGCTAGCTACAACGA CGAGTATG	5551
3023	CUCGGCCC G CUCAUGGU	755	ACCATGAG GGCTAGCTACAACGA GGGCCGAG	5552
3027	GCCCGCUC A UGGUGCUC	756	GAGCACCA GGCTAGCTACAACGA GAGCGGGC	5553
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3092	AUCCGUGA A UGCAUUUU	772	AAAATGCA GGCTAGCTACAACGA TCACGGAT	5569
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3115	GAAAGUCG G UGGGGGGC	778	GCCCCCCA GGCTAGCTACAACGA CGACTTTC	5575
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3125	GGGGGGCA A UAUGUCCA	780	TGGACATA GGCTAGCTACAACGA TGCCCCCC	5577
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3129	GGCAAUAU G UCCAAAUG	782	CATTTGGA GGCTAGCTACAACGA ATATTGCC	5579
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3158	UUGGCCGA A UUGAAAGG	788	CCTTTCAA GGCTAGCTACAACGA TCGGCCAA	5585
3166	AUUGAAAG G UACGUCCG	789	CGGACGTA GGCTAGCTACAACGA CTTTCAAT	5586
3168	UGAAAGGU A CGUCCGUC	790	GACGGACG GGCTAGCTACAACGA ACCTTTCA	5587
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3174	GUACGUCC G UCUAUGAC	792	GTCATAGA GGCTAGCTACAACGA GGACGTAC	5589
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3189	ACCACCUC A CUCCACUG	796	CAGTGGAG GGCTAGCTACAACGA GAGGTGGT	5593
3194	CUCACUCC A CUGCAGGA	797	TCCTGCAG GGCTAGCTACAACGA GGAGTGAG	5594
3197	ACUCCACU G CAGGACUG	798	CAGTCCTG GGCTAGCTACAACGA AGTGGAGT	5595
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3221	ACAGGUCU A CGAGACCU	804	AGGTCTCG GGCTAGCTACAACGA AGACCTGT	5601
3226	UCUACGAG A CCUGGCGG	805	CCGCCAGG GGCTAGCTACAACGA CTCGTAGA	5602
3231	GAGACCUG G CGGUAGCG	806	CGCTACCG GGCTAGCTACAACGA CAGGTCTC	5603
3234	ACCUGGCG G UAGCGGUC	807	GACCGCTA GGCTAGCTACAACGA CGCCAGGT	5604
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3245	GCGGUCGA G CCCGUCGU	810	ACGACGGG GGCTAGCTACAACGA TCGACCGC	5607
3249	UCGAGCCC G UCGUCUUC	811	GAAGACGA GGCTAGCTACAACGA GGGCTCGA	5608
3252	AGCCCGUC G UCUUCUCC	812	GGAGAAGA GGCTAGCTACAACGA GACGGGCT	5609
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3264	UCUCCGAC A UGGAAAUC	814	GATTTCCA GGCTAGCTACAACGA GTCGGAGA	5611
3270	ACAUGGAA A UCAAGAUC	815	GATCTTGA GGCTAGCTACAACGA TTCCATGT	5612
3276	AAAUCAAG A UCAUCACC	816	GGTGATGA GGCTAGCTACAACGA CTTGATTT	5613
3279	UCAAGAUC A UCACCUGG	817	CCAGGTGA GGCTAGCTACAACGA GATCTTGA	5614
3282	AGAUCAUC A CCUGGGGG	818	CCCCCAGG GGCTAGCTACAACGA GATGATCT	5615
3295	GGGGGGAG A CACCGCGG	819	CCGCGGTG GGCTAGCTACAACGA CTCCCCCC	5616
3297	GGGGAGAC A CCGCGGCG	820	CGCCGCGG GGCTAGCTACAACGA GTCTCCCC	5617
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3305	ACCGCGGC G UGUGGGGA	823	TCCCCACA GGCTAGCTACAACGA GCCGCGGT	5620
3307	CGCGGCGU G UGGGGACA	824	TGTCCCCA GGCTAGCTACAACGA ACGCCGCG	5621
3313	GUGUGGGG A CAUCAUUA	825	TAATGATG GGCTAGCTACAACGA CCCCACAC	5622
3315	GUGGGGAC A UCAUUAUG	826	CATAATGA GGCTAGCTACAACGA GTCCCCAC	5623
3318	GGGACAUC A UUAUGGGU	827	ACCCATAA GGCTAGCTACAACGA GATGTCCC	5624
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3325	CAUUAUGG G UCUACCUG	829	CAGGTAGA GGCTAGCTACAACGA CCATAATG	5626
3329	AUGGGUCU A CCUGUCUC	830	GAGACAGG GGCTAGCTACAACGA AGACCCAT	5627
3333	GUCUACCU G UCUCCGCC	831	GGCGGAGA GGCTAGCTACAACGA AGGTAGAC	5628
3339	CUGUCUCC G CCCGAAGG	832	CCTTCGGG GGCTAGCTACAACGA GGAGACAG	5629
3357	GGAGGGAG A UACUCCUA	833	TAGGAGTA GGCTAGCTACAACGA CTCCCTCC	5630
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3376	ACCAGCCG A CAGUCUUG	837	CAAGACTG GGCTAGCTACAACGA CGGCTGGT	5634
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3389	CUUGAGGG G CAGGGGUG	839	CACCCCTG GGCTAGCTACAACGA CCCTCAAG	5636
3395	GGGCAGGG G UGGCGACU	840	AGTCGCCA GGCTAGCTACAACGA CCCTGCCC	5637
3398	CAGGGGUG G CGACUCCU	841	AGGAGTCG GGCTAGCTACAACGA CACCCCTG	5638
3401	GGGUGGCG A CUCCUCGC	842	GCGAGGAG GGCTAGCTACAACGA CGCCACCC	5639
3408	GACUCCUC G CGCCCAUU	843	AATGGGCG GGCTAGCTACAACGA GAGGAGTC	5640
3410	CUCCUCGC G CCCAUUAC	844	GTAATGGG GGCTAGCTACAACGA GCGAGGAG	5641
3414	UCGCGCCC A UUACGGCC	845	GGCCGTAA GGCTAGCTACAACGA GGGCGCGA	5642
3417	CGCCCAUU A CGGCCUAC	846	GTAGGCCG GGCTAGCTACAACGA AATGGGCG	5643
3420	CCAUUACG G CCUACUCC	847	GGAGTAGG GGCTAGCTACAACGA CGTAATGG	5644
3424	UACGGCCU A CUCCCAAC	848	GTTGGGAG GGCTAGCTACAACGA AGGCCGTA	5645
3431	UACUCCCA A CAGACGCG	849	CGCGTCTG GGCTAGCTACAACGA TGGGAGTA	5646
3435	CCCAACAG A CGCGGGGC	850	GCCCCGCG GGCTAGCTACAACGA CTGTTGGG	5647

3437	CAACAGAC G CGGGGCCU	851	AGGCCCCG GGCTAGCTACAACGA GTCTGTTG	5648
3442	GACGCGGG G CCUGUUUG	852	CAAACAGG GGCTAGCTACAACGA CCCGCGTC	5649
3446	CGGGGCCU G UUUGGCUG	853	CAGCCAAA GGCTAGCTACAACGA AGGCCCCG	5650
3451	CCUGUUUG G CUGCAUUA	854	TAATGCAG GGCTAGCTACAACGA CAAACAGG	5651
3454	GUUUGGCU G CAUUAUCA	855	TGATAATG GGCTAGCTACAACGA AGCCAAAC	5652
3456	UUGGCUGC A UUAUCACC	856	GGTGATAA GGCTAGCTACAACGA GCAGCCAA	5653
3459	GCUGCAUU A UCACCAGC	857	GCTGGTGA GGCTAGCTACAACGA AATGCAGC	5654
3462	GCAUUAUC A CCAGCCUC	858	GAGGCTGG GGCTAGCTACAACGA GATAATGC	5655
3466	UAUCACCA G CCUCACGG	859	CCGTGAGG GGCTAGCTACAACGA TGGTGATA	5656
3471	CCAGCCUC A CGGGCCGG	860	CCGGCCCG GGCTAGCTACAACGA GAGGCTGG	5657
3475	CCUCACGG G CCGGGACA	861	TGTCCCGG GGCTAGCTACAACGA CCGTGAGG	5658
3481	GGGCCGGG A CAAGAACC	862	GGTTCTTG GGCTAGCTACAACGA CCCGGCCC	5659
3487	GGACAAGA A CCAAGUCG	863	CGACTTGG GGCTAGCTACAACGA TCTTGTCC	5660
3492	AGAACCAA G UCGAGGGG	864	CCCCTCGA GGCTAGCTACAACGA TTGGTTCT	5661
3504	AGGGGGAA G UUCAAGUG	865	CACTTGAA GGCTAGCTACAACGA TTCCCCCT	5662
3510	AAGUUCAA G UGGUUUCC	866	GGAAACCA GGCTAGCTACAACGA TTGAACTT	5663
3513	UUCAAGUG G UUUCCACC	867	GGTGGAAA GGCTAGCTACAACGA CACTTGAA	5664
3519	UGGUUUCC A CCGCGACG	868	CGTCGCGG GGCTAGCTACAACGA GGAAACCA	5665
3522	UUUCCACC G CGACGCAG	869	CTGCGTCG GGCTAGCTACAACGA GGTGGAAA	5666
3525	CCACCGCG A CGCAGUCU	870	AGACTGCG GGCTAGCTACAACGA CGCGGTGG	5667
3527	ACCGCGAC G CAGUCUUU	871	AAAGACTG GGCTAGCTACAACGA GTCGCGGT	5668
3530	GCGACGCA G UCUUUCCU	872	AGGAAAGA GGCTAGCTACAACGA TGCGTCGC	5669
3540	CUUUCCUA G CGACCUGC	873	GCAGGTCG GGCTAGCTACAACGA TAGGAAAG	5670
3543	UCCUAGCG A CCUGCGUC	874	GACGCAGG GGCTAGCTACAACGA CGCTAGGA	5671
3547	AGCGACCU G CGUCAACG	875	CGTTGACG GGCTAGCTACAACGA AGGTCGCT	5672
3549	CGACCUGC G UCAACGGC	876	GCCGTTGA GGCTAGCTACAACGA GCAGGTCG	5673
3553	CUGCGUCA A CGGCGUGU	877	ACACGCCG GGCTAGCTACAACGA TGACGCAG	5674
3556	CGUCAACG G CGUGUGCU	878	AGCACACG GGCTAGCTACAACGA CGTTGACG	5675
3558	UCAACGGC G UGUGCUGG	879	CCAGCACA GGCTAGCTACAACGA GCCGTTGA	5676
3560	AACGGCGU G UGCUGGAC	880	GTCCAGCA GGCTAGCTACAACGA ACGCCGTT	5677
3562	CGGCGUGU G CUGGACUG	881	CAGTCCAG GGCTAGCTACAACGA ACACGCCG	5678
3567	UGUGCUGG A CUGUCUAC	882	GTAGACAG GGCTAGCTACAACGA CCAGCACA	5679
3570	GCUGGACU G UCUACCAC	883	GTGGTAGA GGCTAGCTACAACGA AGTCCAGC	5680
3574	GACUGUCU A CCACGGCG	884	CGCCGTGG GGCTAGCTACAACGA AGACAGTC	5681
3577	UGUCUACC A CGGCGCCG	885	CGGCGCCG GGCTAGCTACAACGA GGTAGACA	5682
3580	CUACCACG G CGCCGGCU	886	AGCCGGCG GGCTAGCTACAACGA CGTGGTAG	5683
3582	ACCACGGC G CCGGCUCA	887	TGAGCCGG GGCTAGCTACAACGA GCCGTGGT	5684
3586	CGGCGCCG G CUCAAAGA	888	TCTTTGAG GGCTAGCTACAACGA CGGCGCCG	5685
3594	GCUCAAAG A CCCUAGCC	889	GGCTAGGG GGCTAGCTACAACGA CTTTGAGC	5686
3600	AGACCCUA G CCGGCCCA	890	TGGGCCGG GGCTAGCTACAACGA TAGGGTCT	5687
3604	CCUAGCCG G CCCAAAGG	891	CCTTTGGG GGCTAGCTACAACGA CGGCTAGG	5688
3613	CCCAAAGG G UCCAAUCA	892	TGATTGGA GGCTAGCTACAACGA CCTTTGGG	5689
3618	AGGGUCCA A UCACCCAA	893	TTGGGTGA GGCTAGCTACAACGA TGGACCCT	5690
3621	GUCCAAUC A CCCAAAUG	894	CATTTGGG GGCTAGCTACAACGA GATTGGAC	5691
3627	UCACCCAA A UGUACACC	895	GGTGTACA GGCTAGCTACAACGA TTGGGTGA	5692
3629	ACCCAAAU G UACACCAA	896	TTGGTGTA GGCTAGCTACAACGA ATTTGGGT	5693
3631	CCAAAUGU A CACCAAUG	897	CATTGGTG GGCTAGCTACAACGA ACATTTGG	5694
3633	AAAUGUAC A CCAAUGUA	898	TACATTGG GGCTAGCTACAACGA GTACATTT	5695
3637	GUACACCA A UGUAGACC	899	GGTCTACA GGCTAGCTACAACGA TGGTGTAC	5696
3639	ACACCAAU G UAGACCAG	900	CTGGTCTA GGCTAGCTACAACGA ATTGGTGT	5697
3643	CAAUGUAG A CCAGGACC	901	GGTCCTGG GGCTAGCTACAACGA CTACATTG	5698
3649	AGACCAGG A CCUCGUCG	902	CGACGAGG GGCTAGCTACAACGA CCTGGTCT	5699
3654	AGGACCUC G UCGGAUGG	903	CCATCCGA GGCTAGCTACAACGA GAGGTCCT	5700
3659	CUCGUCGG A UGGCCGGC	904	GCCGGCCA GGCTAGCTACAACGA CCGACGAG	5701
3662	GUCGGAUG G CCGGCGCC	905	GGCGCCGG GGCTAGCTACAACGA CATCCGAC	5702
3666	GAUGGCCG G CGCCCCCC	906	GGGGGGCG GGCTAGCTACAACGA CGGCCATC	5703
3668	UGGCCGGC G CCCCCCGG	907	CCGGGGGG GGCTAGCTACAACGA GCCGGCCA	5704

3678	CCCCCGGA G CGCGGUCC	908	GGACCGCG GGCTAGCTACAACGA TCCGGGGG	5705
3680	CCCGGAGC G CGGUCCUU	909	AAGGACCG GGCTAGCTACAACGA GCTCCGGG	5706
3683	GGAGCGCG G UCCUUGAC	910	GTCAAGGA GGCTAGCTACAACGA CGCGCTCC	5707
3690	GGUCCUUG A CACCAUGC	911	GCATGGTG GGCTAGCTACAACGA CAAGGACC	5708
3692	UCCUUGAC A CCAUGCAC	912	GTGCATGG GGCTAGCTACAACGA GTCAAGGA	5709
3695	UUGACACC A UGCACCUG	913	CAGGTGCA GGCTAGCTACAACGA GGTGTCAA	5710
3697	GACACCAU G CACCUGCG	914	CGCAGGTG GGCTAGCTACAACGA ATGGTGTC	5711
3699	CACCAUGC A CCUGCGGC	915	GCCGCAGG GGCTAGCTACAACGA GCATGGTG	5712
3703	AUGCACCU G CGGCGGCU	916	AGCCGCCG GGCTAGCTACAACGA AGGTGCAT	5713
3706	CACCUGCG G CGGCUCGG	917	CCGAGCCG GGCTAGCTACAACGA CGCAGGTG	5714
3709	CUGCGGCG G CUCGGACC	918	GGTCCGAG GGCTAGCTACAACGA CGCCGCAG	5715
3715	CGGCUCGG A CCUUUACU	919	AGTAAAGG GGCTAGCTACAACGA CCGAGCCG	5716
3721	GGACCUUU A CUUGGUCA	920	TGACCAAG GGCTAGCTACAACGA AAAGGTCC	5717
3726	UUUACUUG G UCACGAGA	921	TCTCGTGA GGCTAGCTACAACGA CAAGTAAA	5718
3729	ACUUGGUC A CGAGACAC	922	GTGTCTCG GGCTAGCTACAACGA GACCAAGT	5719
3734	GUCACGAG A CACGCUGA	923	TCAGCGTG GGCTAGCTACAACGA CTCGTGAC	5720
3736	CACGAGAC A CGCUGAUG	924	CATCAGCG GGCTAGCTACAACGA GTCTCGTG	5721
3738	CGAGACAC G CUGAUGUC	925	GACATCAG GGCTAGCTACAACGA GTGTCTCG	5722
3742	ACACGCUG A UGUCAUUC	926	GAATGACA GGCTAGCTACAACGA CAGCGTGT	5723
3744	ACGCUGAU G UCAUUCCG	927	CGGAATGA GGCTAGCTACAACGA ATCAGCGT	5724
3747	CUGAUGUC A UUCCGGUG	928	CACCGGAA GGCTAGCTACAACGA GACATCAG	5725
3753	UCAUUCCG G UGCGCCGG	929	CCGGCGCA GGCTAGCTACAACGA CGGAATGA	5726
3755	AUUCCGGU G CGCCGGCG	930	CGCCGGCG GGCTAGCTACAACGA ACCGGAAT	5727
3757	UCCGGUGC G CCGGCGGG	931	CCCGCCGG GGCTAGCTACAACGA GCACCGGA	5728
3761	GUGCGCCG G CGGGGUGA	932	TCACCCCG GGCTAGCTACAACGA CGGCGCAC	5729
3766	CCGGCGGG G UGACAGCA	933	TGCTGTCA GGCTAGCTACAACGA CCCGCCGG	5730
3769	GCGGGGUG A CAGCAGGG	934	CCCTGCTG GGCTAGCTACAACGA CACCCCGC	5731
3772	GGGUGACA G CAGGGGGA	935	TCCCCCTG GGCTAGCTACAACGA TGTCACCC	5732
3781	CAGGGGGA G CUUACUAU	936	ATAGTAAG GGCTAGCTACAACGA TCCCCCTG	5733
3785	GGGAGCUU A CUAUCCCC	937	GGGGATAG GGCTAGCTACAACGA AAGCTCCC	5734
3788	AGCUUACU A UCCCCCAG	938	CTGGGGGA GGCTAGCTACAACGA AGTAAGCT	5735
3797	UCCCCCAG G CCCAUCUC	939	GAGATGGG GGCTAGCTACAACGA CTGGGGGA	5736
3801	CCAGGCCC A UCUCCUAC	940	GTAGGAGA GGCTAGCTACAACGA GGGCCTGG	5737
3808	CAUCUCCU A CUUGAAGG	941	CCTTCAAG GGCTAGCTACAACGA AGGAGATG	5738
3817	CUUGAAGG G CUCCUCGG	942	CCGAGGAG GGCTAGCTACAACGA CCTTCAAG	5739
3826	CUCCUCGG G CGGUCCAC	943	GTGGACCG GGCTAGCTACAACGA CCGAGGAG	5740
3829	CUCGGGCG G UCCACUGC	944	GCAGTGGA GGCTAGCTACAACGA CGCCCGAG	5741
3833	GGCGGUCC A CUGCUCUG	945	CAGAGCAG GGCTAGCTACAACGA GGACCGCC	5742
3836	GGUCCACU G CUCUGCCC	946	GGGCAGAG GGCTAGCTACAACGA AGTGGACC	5743
3841	ACUGCUCU G CCCUUCGG	947	CCGAAGGG GGCTAGCTACAACGA AGAGCAGT	5744
3851	CCUUCGGG G CACGUUGU	948	ACAACGTG GGCTAGCTACAACGA CCCGAAGG	5745
3853	UUCGGGGC A CGUUGUGG	949	CCACAACG GGCTAGCTACAACGA GCCCCGAA	5746
3855	CGGGGCAC G UUGUGGGC	950	GCCCACAA GGCTAGCTACAACGA GTGCCCCG	5747
3858	GGCACGUU G UGGGCAUC	951	GATGCCCA GGCTAGCTACAACGA AACGTGCC	5748
3862	CGUUGUGG G CAUCUUCC	952	GGAAGATG GGCTAGCTACAACGA CCACAACG	5749
3864	UUGUGGGC A UCUUCCGG	953	CCGGAAGA GGCTAGCTACAACGA GCCCACAA	5750
3873	UCUUCCGG G CUGCUGUG	954	CACAGCAG GGCTAGCTACAACGA CCGGAAGA	5751
3876	UCCGGGCU G CUGUGUGC	955	GCACACAG GGCTAGCTACAACGA AGCCCGGA	5752
3879	GGGCUGCU G UGUGCACC	956	GGTGCACA GGCTAGCTACAACGA AGCAGCCC	5753
3881	GCUGCUGU G UGCACCCG	957	CGGGTGCA GGCTAGCTACAACGA ACAGCAGC	5754
3883	UGCUGUGU G CACCCGGG	958	CCCGGGTG GGCTAGCTACAACGA ACACAGCA	5755
3885	CUGUGUGC A CCCGGGGG	959	CCCCCGGG GGCTAGCTACAACGA GCACACAG	5756
3894	CCCGGGGG G UUGCGAAG	960	CTTCGCAA GGCTAGCTACAACGA CCCCCGGG	5757
3897	GGGGGGUU G CGAAGGCG	961	CGCCTTCG GGCTAGCTACAACGA AACCCCCC	5758
3903	UUGCGAAG G CGGUGGAC	962	GTCCACCG GGCTAGCTACAACGA CTTCGCAA	5759
3906	CGAAGGCG G UGGACUUU	963	AAAGTCCA GGCTAGCTACAACGA CGCCTTCG	5760
3910	GGCGGUGG A CUUUGUAC	964	GTACAAAG GGCTAGCTACAACGA CCACCGCC	5761

3915	UGGACUUU G UACCCGUU	965	AACGGGTA GGCTAGCTACAACGA AAAGTCCA	5762
3917	GACUUUGU A CCCGUUGA	966	TCAACGGG GGCTAGCTACAACGA ACAAAGTC	5763
3921	UUGUACCC G UUGAGUCU	967	AGACTCAA GGCTAGCTACAACGA GGGTACAA	5764
3926	CCCGUUGA G UCUAUGGA	968	TCCATAGA GGCTAGCTACAACGA TCAACGGG	5765
3930	UUGAGUCU A UGGAAACU	969	AGTTTCCA GGCTAGCTACAACGA AGACTCAA	5766
3936	CUAUGGAA A CUACCAUG	970	CATGGTAG GGCTAGCTACAACGA TTCCATAG	5767
3939	UGGAAACU A CCAUGCGG	971	CCGCATGG GGCTAGCTACAACGA AGTTTCCA	5768
3942	AAACUACC A UGCGGUCC	972	GGACCGCA GGCTAGCTACAACGA GGTAGTTT	5769
3944	ACUACCAU G CGGUCCCC	973	GGGGACCG GGCTAGCTACAACGA ATGGTAGT	5770
3947	ACCAUGCG G UCCCCGGU	974	ACCGGGGA GGCTAGCTACAACGA CGCATGGT	5771
3954	GGUCCCCG G UCUUCACG	975	CGTGAAGA GGCTAGCTACAACGA CGGGGACC	5772
3960	CGGUCUUC A CGGACAAC	976	GTTGTCCG GGCTAGCTACAACGA GAAGACCG	5773
3964	CUUCACGG A CAACUCGU	977	ACGAGTTG GGCTAGCTACAACGA CCGTGAAG	5774
3967	CACGGACA A CUCGUCCC	978	GGGACGAG GGCTAGCTACAACGA TGTCCGTG	5775
3971	GACAACUC G UCCCCCCC	979	GGGGGGGA GGCTAGCTACAACGA GAGTTGTC	5776
3981	CCCCCCCA G CCGUACCG	980	CGGTACGG GGCTAGCTACAACGA TGGGGGGG	5777
3984	CCCCAGCC G UACCGCAG	981	CTGCGGTA GGCTAGCTACAACGA GGCTGGGG	5778
3986	CCAGCCGU A CCGCAGAC	982	GTCTGCGG GGCTAGCTACAACGA ACGGCTGG	5779
3989	GCCGUACC G CAGACAUU	983	AATGTCTG GGCTAGCTACAACGA GGTACGGC	5780
3993	UACCGCAG A CAUUCCAA	984	TTGGAATG GGCTAGCTACAACGA CTGCGGTA	5781
3995	CCGCAGAC A UUCCAAGU	985	ACTTGGAA GGCTAGCTACAACGA GTCTGCGG	5782
4002	CAUUCCAA G UGGCCCAC	986	GTGGGCCA GGCTAGCTACAACGA TTGGAATG	5783
4005	UCCAAGUG G CCCACCUA	987	TAGGTGGG GGCTAGCTACAACGA CACTTGGA	5784
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4015	CCACCUAC A CGCUCCCA	990	TGGGAGCG GGCTAGCTACAACGA GTAGGTGG	5787
4017	ACCUACAC G CUCCCACU	991	AGTGGGAG GGCTAGCTACAACGA GTGTAGGT	5788
4023	ACGCUCCC A CUGGCAGC	992	GCTGCCAG GGCTAGCTACAACGA GGGAGCGT	5789
4027	UCCCACUG G CAGCGGCA	993	TGCCGCTG GGCTAGCTACAACGA CAGTGGGA	5790
4030	CACUGGCA G CGGCAAGA	994	TCTTGCCG GGCTAGCTACAACGA TGCCAGTG	5791
4033	UGGCAGCG G CAAGAGCA	995	TGCTCTTG GGCTAGCTACAACGA CGCTGCCA	5792
4039	CGGCAAGA G CACUAAGG	996	CCTTAGTG GGCTAGCTACAACGA TCTTGCCG	5793
4041	GCAAGAGC A CUAAGGUA	997	TACCTTAG GGCTAGCTACAACGA GCTCTTGC	5794
4047	GCACUAAG G UACCGGCU	998	AGCCGGTA GGCTAGCTACAACGA CTTAGTGC	5795
4049	ACUAAGGU A CCGGCUGC	999	GCAGCCGG GGCTAGCTACAACGA ACCTTAGT	5796
4053	AGGUACCG G CUGCAUAU	1000	ATATGCAG GGCTAGCTACAACGA CGGTACCT	5797
4056	UACCGGCU G CAUAUGCA	1001	TGCATATG GGCTAGCTACAACGA AGCCGGTA	5798
4058	CCGGCUGC A UAUGCAGC	1002	GCTGCATA GGCTAGCTACAACGA GCAGCCGG	5799
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4065	CAUAUGCA G CCCAAGGG	1005	CCCTTGGG GGCTAGCTACAACGA TGCATATG	5802
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4075	CCAAGGGU A CAAAGUGC	1007	GCACTTTG GGCTAGCTACAACGA ACCCTTGG	5804
4080	GGUACAAA G UGCUCGUC	1008	GACGAGCA GGCTAGCTACAACGA TTTGTACC	5805
4082	UACAAAGU G CUCGUCCU	1009	AGGACGAG GGCTAGCTACAACGA ACTTTGTA	5806
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4107	CCGUUACC G CCACCUUA	1015	TAAGGTGG GGCTAGCTACAACGA GGTAACGG	5812
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4127	UUUGGGGC G UAUAUGUC	1019	GACATATA GGCTAGCTACAACGA GCCCCAAA	5816
4129	UGGGGCGU A UAUGUCUA	1020	TAGACATA GGCTAGCTACAACGA ACGCCCCA	5817
4131	GGGCGUAU A UGUCUAAG	1021	CTTAGACA GGCTAGCTACAACGA ATACGCCC	5818

4133	GCGUAUAU G UCUAAGGC	1022	GCCTTAGA GGCTAGCTACAACGA ATATACGC	5819
4140	UGUCUAAG G CACACGGU	1023	ACCGTGTG GGCTAGCTACAACGA CTTAGACA	5820
4142	UCUAAGGC A CACGGUGU	1024	ACACCGTG GGCTAGCTACAACGA GCCTTAGA	5821
4144	UAAGGCAC A CGGUGUCG	1025	CGACACCG GGCTAGCTACAACGA GTGCCTTA	5822
4147	GGCACACG G UGUCGAUC	1026	GATCGACA GGCTAGCTACAACGA CGTGTGCC	5823
4149	CACACGGU G UCGAUCCU	1027	AGGATCGA GGCTAGCTACAACGA ACCGTGTG	5824
4153	CGGUGUCG A UCCUAACA	1028	TGTTAGGA GGCTAGCTACAACGA CGACACCG	5825
4159	CGAUCCUA A CAUCAGAA	1029	TTCTGATG GGCTAGCTACAACGA TAGGATCG	5826
4161	AUCCUAAC A UCAGAACU	1030	AGTTCTGA GGCTAGCTACAACGA GTTAGGAT	5827
4167	ACAUCAGA A CUGGGGUA	1031	TACCCCAG GGCTAGCTACAACGA TCTGATGT	5828
4173	GAACUGGG G UAAGGACC	1032	GGTCCTTA GGCTAGCTACAACGA CCCAGTTC	5829
4179	GGGUAAGG A CCAUCACC	1033	GGTGATGG GGCTAGCTACAACGA CCTTACCC	5830
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4185	GGACCAUC A CCACGGGC	1035	GCCCGTGG GGCTAGCTACAACGA GATGGTCC	5832
4188	CCAUCACC A CGGGCGCC	1036	GGCGCCCG GGCTAGCTACAACGA GGTGATGG	5833
4192	CACCACGG G CGCCCCCA	1037	TGGGGGCG GGCTAGCTACAACGA CCGTGGTG	5834
4194	CCACGGGC G CCCCCAUC	1038	GATGGGGG GGCTAGCTACAACGA GCCCGTGG	5835
4200	GCGCCCCC A UCACGUAC	1039	GTACGTGA GGCTAGCTACAACGA GGGGGCGC	5836
4203	CCCCCAUC A CGUACUCC	1040	GGAGTACG GGCTAGCTACAACGA GATGGGGG	5837
4205	CCCAUCAC G UACUCCAC	1041	GTGGAGTA GGCTAGCTACAACGA GTGATGGG	5838
4207	CAUCACGU A CUCCACCU	1042	AGGTGGAG GGCTAGCTACAACGA ACGTGATG	5839
4212	CGUACUCC A CCUAUGGC	1043	GCCATAGG GGCTAGCTACAACGA GGAGTACG	5840
4216	CUCCACCU A UGGCAAGU	1044	ACTTGCCA GGCTAGCTACAACGA AGGTGGAG	5841
4219	CACCUAUG G CAAGUUCC	1045	GGAACTTG GGCTAGCTACAACGA CATAGGTG	5842
4223	UAUGGCAA G UUCCUUGC	1046	GCAAGGAA GGCTAGCTACAACGA TTGCCATA	5843
4230	AGUUCCUU G CCGACGGU	1047	ACCGTCGG GGCTAGCTACAACGA AAGGAACT	5844
4234	CCUUGCCG A CGGUGGUU	1048	AACCACCG GGCTAGCTACAACGA CGGCAAGG	5845
4237	UGCCGACG G UGGUUGCU	1049	AGCAACCA GGCTAGCTACAACGA CGTCGGCA	5846
4240	CGACGGUG G UUGCUCUG	1050	CAGAGCAA GGCTAGCTACAACGA CACCGTCG	5847
4243	CGGUGGUU G CUCUGGGG	1051	CCCCAGAG GGCTAGCTACAACGA AACCACCG	5848
4252	CUCUGGGG G CGCCUAUG	1052	CATAGGCG GGCTAGCTACAACGA CCCCAGAG	5849
4254	CUGGGGGC G CCUAUGAC	1053	GTCATAGG GGCTAGCTACAACGA GCCCCCAG	5850
4258	GGGCGCCU A UGACAUCA	1054	TGATGTCA GGCTAGCTACAACGA AGGCGCCC	5851
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4263	CCUAUGAC A UCAUAAUG	1056	CATTATGA GGCTAGCTACAACGA GTCATAGG	5853
4266	AUGACAUC A UAAUGUGU	1057	ACACATTA GGCTAGCTACAACGA GATGTCAT	5854
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4276	AAUGUGUG A UGAGUGCC	1061	GGCACTCA GGCTAGCTACAACGA CACACATT	5858
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4282	UGAUGAGU G CCACUCAA	1063	TTGAGTGG GGCTAGCTACAACGA ACTCATCA	5860
4285	UGAGUGCC A CUCAAUUG	1064	CAATTGAG GGCTAGCTACAACGA GGCACTCA	5861
4290	GCCACUCA A UUGACUCG	1065	CGAGTCAA GGCTAGCTACAACGA TGAGTGGC	5862
4294	CUCAAUUG A CUCGACUU	1066	AAGTCGAG GGCTAGCTACAACGA CAATTGAG	5863
4299	UUGACUCG A CUUCCAUU	1067	AATGGAAG GGCTAGCTACAACGA CGAGTCAA	5864
4305	CGACUUCC A UUUUGGGC	1068	GCCCAAAA GGCTAGCTACAACGA GGAAGTCG	5865
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4314	UUUUGGGC A UCGGCACA	1070	TGTGCCGA GGCTAGCTACAACGA GCCCAAAA	5867
4318	GGGCAUCG G CACAGUCC	1071	GGACTGTG GGCTAGCTACAACGA CGATGCCC	5868
4320	GCAUCGGC A CAGUCCUG	1072	CAGGACTG GGCTAGCTACAACGA GCCGATGC	5869
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4330	AGUCCUGG A CCAAGCGG	1074	CCGCTTGG GGCTAGCTACAACGA CCAGGACT	5871
4335	UGGACCAA G CGGAGACG	1075	CGTCTCCG GGCTAGCTACAACGA TTGGTCCA	5872
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4344	CGGAGACG G CUGGAGCG	1077	CGCTCCAG GGCTAGCTACAACGA CGTCTCCG	5874
4350	CGGCUGGA G CGCGGCUC	1078	GAGCCGCG GGCTAGCTACAACGA TCCAGCCG	5875

4352	GCUGGAGC G CGGCUCGU	1079	ACGAGCCG GGCTAGCTACAACGA GCTCCAGC	5876
4355	GGAGCGCG G CUCGUCGU	1080	ACGACGAG GGCTAGCTACAACGA CGCGCTCC	5877
4359	CGCGGCUC G UCGUGCUC	1081	GAGCACGA GGCTAGCTACAACGA GAGCCGCG	5878
4362	GGCUCGUC G UGCUCGCC	1082	GGCGAGCA GGCTAGCTACAACGA GACGAGCC	5879
4364	CUCGUCGU G CUCGCCAC	1083	GTGGCGAG GGCTAGCTACAACGA ACGACGAG	5880
4368	UCGUGCUC G CCACCGCU	1084	AGCGGTGG GGCTAGCTACAACGA GAGCACGA	5881
4371	UGCUCGCC A CCGCUACG	1085	CGTAGCGG GGCTAGCTACAACGA GGCGAGCA	5882
4374	UCGCCACC G CUACGCCU	1086	AGGCGTAG GGCTAGCTACAACGA GGTGGCGA	5883
4377	CCACCGCU A CGCCUCCG	1087	CGGAGGCG GGCTAGCTACAACGA AGCGGTGG	5884
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4388	CCUCCGGG A UCGGUCAC	1089	GTGACCGA GGCTAGCTACAACGA CCCGGAGG	5886
4392	CGGGAUCG G UCACCGUG	1090	CACGGTGA GGCTAGCTACAACGA CGATCCCG	5887
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4398	CGGUCACC G UGCCACAU	1092	ATGTGGCA GGCTAGCTACAACGA GGTGACCG	5889
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4437	UGUCCAAC A CCGGAGAG	1102	CTCTCCGG GGCTAGCTACAACGA GTTGGACA	5899
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4456	CCCCUUCU A UGGCAAAG	1104	CTTTGCCA GGCTAGCTACAACGA AGAAGGGG	5901
4459	CUUCUAUG G CAAAGCCA	1105	TGGCTTTG GGCTAGCTACAACGA CATAGAAG	5902
4464	AUGGCAAA G CCAUCCCC	1106	GGGGATGG GGCTAGCTACAACGA TTTGCCAT	5903
4467	GCAAAGCC A UCCCCAUC	1107	GATGGGGA GGCTAGCTACAACGA GGCTTTGC	5904
4473	CCAUCCCC A UCGAGACC	1108	GGTCTCGA GGCTAGCTACAACGA GGGGATGG	5905
4479	CCAUCGAG A CCAUCAAA	1109	TTTGATGG GGCTAGCTACAACGA CTCGATGG	5906
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4510	CAUCUUCU G CCAUUCCA	1114	TGGAATGG GGCTAGCTACAACGA AGAAGATG	5911
4513	CUUCUGCC A UUCCAAGA	1115	TCTTGGAA GGCTAGCTACAACGA GGCAGAAG	5912
4526	AAGAAGAA A UGUGACGA	1116	TCGTCACA GGCTAGCTACAACGA TTCTTCTT	5913
4528	GAAGAAAU G UGACGAGC	1117	GCTCGTCA GGCTAGCTACAACGA ATTTCTTC	5914
4531	GAAAUGUG A CGAGCUCG	1118	CGAGCTCG GGCTAGCTACAACGA CACATTTC	5915
4535	UGUGACGA G CUCGCUGC	1119	GCAGCGAG GGCTAGCTACAACGA TCGTCACA	5916
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4547	GCUGCAAA G CUGUCGGG	1122	CCCGACAG GGCTAGCTACAACGA TTTGCAGC	5919
4550	GCAAAGCU G UCGGGCCU	1123	AGGCCCGA GGCTAGCTACAACGA AGCTTTGC	5920
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4562	GGCCUCGG A CUUAACGC	1125	GCGTTAAG GGCTAGCTACAACGA CCGAGGCC	5922
4567	CGGACUUA A CGCUGUAG	1126	CTACAGCG GGCTAGCTACAACGA TAAGTCCG	5923
4569	GACUUAAC G CUGUAGCG	1127	CGCTACAG GGCTAGCTACAACGA GTTAAGTC	5924
4572	UUAACGCU G UAGCGUAU	1128	ATACGCTA GGCTAGCTACAACGA AGCGTTAA	5925
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4577	GCUGUAGC G UAUUACCG	1130	CGGTAATA GGCTAGCTACAACGA GCTACAGC	5927
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4605	UGUCCGUC A UACCGGCC	1138	GGCCGGTA GGCTAGCTACAACGA GACGGACA	5935
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4615	ACCGGCCA G CGGGGACG	1141	CGTCCCCG GGCTAGCTACAACGA TGGCCGGT	5938
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5217	GGCUAGGA G CCGUCCAA	1289	TTGGACGG GGCTAGCTACAACGA TCCTAGCC	6086
5220	UAGGAGCC G UCCAAAAU	1290	ATTTTGGA GGCTAGCTACAACGA GGCTCCTA	6087
5227	CGUCCAAA A UGAUGUCA	1291	TGACATCA GGCTAGCTACAACGA TTTGGACG	6088
5230	CCAAAAUG A UGUCACCC	1292	GGGTGACA GGCTAGCTACAACGA CATTTTGG	6089
5232	AAAAUGAU G UCACCCUC	1293	GAGGGTGA GGCTAGCTACAACGA ATCATTTT	6090
5235	AUGAUGUC A CCCUCACA	1294	TGTGAGGG GGCTAGCTACAACGA GACATCAT	6091
5241	UCACCCUC A CACACCCC	1295	GGGGTGTG GGCTAGCTACAACGA GAGGGTGA	6092
5243	ACCCUCAC A CACCCCAU	1296	ATGGGGTG GGCTAGCTACAACGA GTGAGGGT	6093
5245	CCUCACAC A CCCCAUAA	1297	TTATGGGG GGCTAGCTACAACGA GTGTGAGG	6094
5250	CACACCCC A UAACCAAA	1298	TTTGGTTA GGCTAGCTACAACGA GGGGTGTG	6095
5253	ACCCCAUA A CCAAAUAC	1299	GTATTTGG GGCTAGCTACAACGA TATGGGGT	6096
5258	AUAACCAA A UACAUCAU	1300	ATGATGTA GGCTAGCTACAACGA TTGGTTAT	6097
5260	AACCAAAU A CAUCAUGA	1301	TCATGATG GGCTAGCTACAACGA ATTTGGTT	6098
5262	CCAAAUAC A UCAUGACA	1302	TGTCATGA GGCTAGCTACAACGA GTATTTGG	6099
5265	AAUACAUC A UGACAUGC	1303	GCATGTCA GGCTAGCTACAACGA GATGTATT	6100
5268	ACAUCAUG A CAUGCAUG	1304	CATGCATG GGCTAGCTACAACGA CATGATGT	6101
5270	AUCAUGAC A UGCAUGUC	1305	GACATGCA GGCTAGCTACAACGA GTCATGAT	6102
5272	CAUGACAU G CAUGUCGG	1306	CCGACATG GGCTAGCTACAACGA ATGTCATG	6103

5274	UGACAUGC A UGUCGGCU	1307	AGCCGACA GGCTAGCTACAACGA GCATGTCA	6104
5276	ACAUGCAU G UCGGCUGA	1308	TCAGCCGA GGCTAGCTACAACGA ATGCATGT	6105
5280	GCAUGUCG G CUGACCUG	1309	CAGGTCAG GGCTAGCTACAACGA CGACATGC	6106
5284	GUCGGCUG A CCUGGAGG	1310	CCTCCAGG GGCTAGCTACAACGA CAGCCGAC	6107
5292	ACCUGGAG G UCGUCACC	1311	GGTGACGA GGCTAGCTACAACGA CTCCAGGT	6108
5295	UGGAGGUC G UCACCAGC	1312	GCTGGTGA GGCTAGCTACAACGA GACCTCCA	6109
5298	AGGUCGUC A CCAGCACC	1313	GGTGCTGG GGCTAGCTACAACGA GACGACCT	6110
5302	CGUCACCA G CACCUGGG	1314	CCCAGGTG GGCTAGCTACAACGA TGGTGACG	6111
5304	UCACCAGC A CCUGGGUG	1315	CACCCAGG GGCTAGCTACAACGA GCTGGTGA	6112
5310	GCACCUGG G UGCUAGUA	1316	TACTAGCA GGCTAGCTACAACGA CCAGGTGC	6113
5312	ACCUGGGU G CUAGUAGG	1317	CCTACTAG GGCTAGCTACAACGA ACCCAGGT	6114
5316	GGGUGCUA G UAGGUGGC	1318	GCCACCTA GGCTAGCTACAACGA TAGCACCC	6115
5320	GCUAGUAG G UGGCGUCC	1319	GGACGCCA GGCTAGCTACAACGA CTACTAGC	6116
5323	AGUAGGUG G CGUCCUGG	1320	CCAGGACG GGCTAGCTACAACGA CACCTACT	6117
5325	UAGGUGGC G UCCUGGCA	1321	TGCCAGGA GGCTAGCTACAACGA GCCACCTA	6118
5331	GCGUCCUG G CAGCUCUG	1322	CAGAGCTG GGCTAGCTACAACGA CAGGACGC	6119
5334	UCCUGGCA G CUCUGACC	1323	GGTCAGAG GGCTAGCTACAACGA TGCCAGGA	6120
5340	CAGCUCUG A CCGCGUAU	1324	ATACGCGG GGCTAGCTACAACGA CAGAGCTG	6121
5343	CUCUGACC G CGUAUUGC	1325	GCAATACG GGCTAGCTACAACGA GGTCAGAG	6122
5345	CUGACCGC G UAUUGCCU	1326	AGGCAATA GGCTAGCTACAACGA GCGGTCAG	6123
5347	GACCGCGU A UUGCCUGA	1327	TCAGGCAA GGCTAGCTACAACGA ACGCGGTC	6124
5350	CGCGUAUU G CCUGACGA	1328	TCGTCAGG GGCTAGCTACAACGA AATACGCG	6125
5355	AUUGCCUG A CGACAGGC	1329	GCCTGTCG GGCTAGCTACAACGA CAGGCAAT	6126
5358	GCCUGACG A CAGGCAGC	1330	GCTGCCTG GGCTAGCTACAACGA CGTCAGGC	6127
5362	GACGACAG G CAGCGUGG	1331	CCACGCTG GGCTAGCTACAACGA CTGTCGTC	6128
5365	GACAGGCA G CGUGGUCA	1332	TGACCACG GGCTAGCTACAACGA TGCCTGTC	6129
5367	CAGGCAGC G UGGUCAUU	1333	AATGACCA GGCTAGCTACAACGA GCTGCCTG	6130
5370	GCAGCGUG G UCAUUGUG	1334	CACAATGA GGCTAGCTACAACGA CACGCTGC	6131
5373	GCGUGGUC A UUGUGGGC	1335	GCCCACAA GGCTAGCTACAACGA GACCACGC	6132
5376	UGGUCAUU G UGGGCAGA	1336	TCTGCCCA GGCTAGCTACAACGA AATGACCA	6133
5380	CAUUGUGG G CAGAAUCA	1337	TGATTCTG GGCTAGCTACAACGA CCACAATG	6134
5385	UGGGCAGA A UCAUCUUG	1338	CAAGATGA GGCTAGCTACAACGA TCTGCCCA	6135
5388	GCAGAAUC A UCUUGUCC	1339	GGACAAGA GGCTAGCTACAACGA GATTCTGC	6136
5393	AUCAUCUU G UCCGGGAA	1340	TTCCCGGA GGCTAGCTACAACGA AAGATGAT	6137
5402	UCCGGGAA G CCGGCUGU	1341	ACAGCCGG GGCTAGCTACAACGA TTCCCGGA	6138
5406	GGAAGCCG G CUGUUAUC	1342	GATAACAG GGCTAGCTACAACGA CGGCTTCC	6139
5409	AGCCGGCU G UUAUCCCC	1343	GGGGATAA GGCTAGCTACAACGA AGCCGGCT	6140
5412	CGGCUGUU A UCCCCGAC	1344	GTCGGGGA GGCTAGCTACAACGA AACAGCCG	6141
5419	UAUCCCCG A CAGGGAGG	1345	CCTCCCTG GGCTAGCTACAACGA CGGGGATA	6142
5427	ACAGGGAG G CUCUCUAC	1346	GTAGAGAG GGCTAGCTACAACGA CTCCCTGT	6143
5434	GGCUCUCU A CCAGGAGU	1347	ACTCCTGG GGCTAGCTACAACGA AGAGAGCC	6144
5441	UACCAGGA G UUCGAUGA	1348	TCATCGAA GGCTAGCTACAACGA TCCTGGTA	6145
5446	GGAGUUCG A UGAGAUGG	1349	CCATCTCA GGCTAGCTACAACGA CGAACTCC	6146
5451	UCGAUGAG A UGGAGGAG	1350	CTCCTCCA GGCTAGCTACAACGA CTCATCGA	6147
5459	AUGGAGGA G UGUGCCUC	1351	GAGGCACA GGCTAGCTACAACGA TCCTCCAT	6148
5461	GGAGGAGU G UGCCUCAC	1352	GTGAGGCA GGCTAGCTACAACGA ACTCCTCC	6149
5463	AGGAGUGU G CCUCACAC	1353	GTGTGAGG GGCTAGCTACAACGA ACACTCCT	6150
5468	UGUGCCUC A CACCUCCC	1354	GGGAGGTG GGCTAGCTACAACGA GAGGCACA	6151
5470	UGCCUCAC A CCUCCCUU	1355	AAGGGAGG GGCTAGCTACAACGA GTGAGGCA	6152
5479	CCUCCCUU A CAUCGAAC	1356	GTTCGATG GGCTAGCTACAACGA AAGGGAGG	6153
5481	UCCCUUAC A UCGAACAG	1357	CTGTTCGA GGCTAGCTACAACGA GTAAGGGA	6154
5486	UACAUCGA A CAGGGGAU	1358	ATCCCCTG GGCTAGCTACAACGA TCGATGTA	6155
5493	AACAGGGG A UGCAGCUC	1359	GAGCTGCA GGCTAGCTACAACGA CCCCTGTT	6156
5495	CAGGGGAU G CAGCUCGC	1360	GCGAGCTG GGCTAGCTACAACGA ATCCCCTG	6157
5498	GGGAUGCA G CUCGCCGA	1361	TCGGCGAG GGCTAGCTACAACGA TGCATCCC	6158
5502	UGCAGCUC G CCGAGCAG	1362	CTGCTCGG GGCTAGCTACAACGA GAGCTGCA	6159
5507	CUCGCCGA G CAGUUCAA	1363	TTGAACTG GGCTAGCTACAACGA TCGGCGAG	6160

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5516	CAGUUCAA G CAGAAGGC	1365	GCCTTCTG GGCTAGCTACAACGA TTGAACTG	6162
5523	AGCAGAAG G CGCUCGGA	1366	TCCGAGCG GGCTAGCTACAACGA CTTCTGCT	6163
5525	CAGAAGGC G CUCGGAUU	1367	AATCCGAG GGCTAGCTACAACGA GCCTTCTG	6164
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5544	UGCAAACA G CCACCAAC	1372	GTTGGTGG GGCTAGCTACAACGA TGTTTGCA	6169
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5551	AGCCACCA A CCAAGCGG	1374	CCGCTTGG GGCTAGCTACAACGA TGGTGGCT	6171
5556	CCAACCAA G CGGAGGCU	1375	AGCCTCCG GGCTAGCTACAACGA TTGGTTGG	6172
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5568	AGGCUGCU G CUCCCGUG	1378	CACGGGAG GGCTAGCTACAACGA AGCAGCCT	6175
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5577	CUCCCGUG G UGGAAUCC	1380	GGATTCCA GGCTAGCTACAACGA CACGGGAG	6177
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5588	GAAUCCAA G UGGCGAGC	1382	GCTCGCCA GGCTAGCTACAACGA TTGGATTC	6179
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5595	AGUGGCGA G CCCUUGAG	1384	CTCAAGGG GGCTAGCTACAACGA TCGCCACT	6181
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5622	CGAAGCAC A UGUGGAAU	1389	ATTCCACA GGCTAGCTACAACGA GTGCTTCG	6186
5624	AAGCACAU G UGGAAUUU	1390	AAATTCCA GGCTAGCTACAACGA ATGTGCTT	6187
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5634	GGAAUUUC A UCAGCGGG	1392	CCCGCTGA GGCTAGCTACAACGA GAAATTCC	6189
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5645	AGCGGGAU A CAGUACCU	1395	AGGTACTG GGCTAGCTACAACGA ATCCCGCT	6192
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5663	GCAGGCUU G UCCACUCU	1400	AGAGTGGA GGCTAGCTACAACGA AAGCCTGC	6197
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5700	CAUCAUUG A UGGCAUUC	1409	GAATGCCA GGCTAGCTACAACGA CAATGATG	6206
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5725	CAUCACCA G CCCGCUCA	1416	TGAGCGGG GGCTAGCTACAACGA TGGTGATG	6213
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5736	CGCUCACC A CCCAAAGC	1419	GCTTTGGG GGCTAGCTACAACGA GGTGAGCG	6216
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5745	CCCAAAGC A CCCUCCUG	1421	CAGGAGGG GGCTAGCTACAACGA GCTTTGGG	6218
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5786	GCCGCCCA A CUCGCUCC	1429	GGAGCGAG GGCTAGCTACAACGA TGGGCGGC	6226
5790	CCCAACUC G CUCCCCCC	1430	GGGGGGAG GGCTAGCTACAACGA GAGTTGGG	6227
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5922	CUCUCGUG G CCUUCAAG	1462	CTTGAAGG GGCTAGCTACAACGA CACGAGAG	6259
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5948	GGGGAGAU G CCUUCUAC	1467	GTAGAAGG GGCTAGCTACAACGA ATCTCCCC	6264
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5967	AGGACCUG G UCAACUUA	1470	TAAGTTGA GGCTAGCTACAACGA CAGGTCCT	6267
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6022	GGUGGUGU G CGCAGCGA	1482	TCGCTGCG GGCTAGCTACAACGA ACACCACC	6279
6024	UGGUGUGC G CAGCGAUA	1483	TATCGCTG GGCTAGCTACAACGA GCACACCA	6280
6027	UGUGCGCA G CGAUACUG	1484	CAGTATCG GGCTAGCTACAACGA TGCGCACA	6281
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6032	GCAGCGAU A CUGCGUCG	1486	CGACGCAG GGCTAGCTACAACGA ATCGCTGC	6283
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6037	GAUACUGC G UCGGCAUG	1488	CATGCCGA GGCTAGCTACAACGA GCAGTATC	6285
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6123	UCUCCCCC A CGCACUAU	1510	ATAGTGCG GGCTAGCTACAACGA GGGGGAGA	6307
6125	UCCCCCAC G CACUAUGU	1511	ACATAGTG GGCTAGCTACAACGA GTGGGGGA	6308
6127	CCCCACGC A CUAUGUGC	1512	GCACATAG GGCTAGCTACAACGA GCGTGGGG	6309
6130	CACGCACU A UGUGCCUG	1513	CAGGCACA GGCTAGCTACAACGA AGTGCGTG	6310
6132	CGCACUAU G UGCCUGAG	1514	CTCAGGCA GGCTAGCTACAACGA ATAGTGCG	6311
6134	CACUAUGU G CCUGAGAG	1515	CTCTCAGG GGCTAGCTACAACGA ACATAGTG	6312
6142	GCCUGAGA G CGACGCAG	1516	CTGCGTCG GGCTAGCTACAACGA TCTCAGGC	6313
6145	UGAGAGCG A CGCAGCGG	1517	CCGCTGCG GGCTAGCTACAACGA CGCTCTCA	6314
6147	AGAGCGAC G CAGCGGCG	1518	CGCCGCTG GGCTAGCTACAACGA GTCGCTCT	6315
6150	GCGACGCA G CGGCGCGC	1519	GCGCGCCG GGCTAGCTACAACGA TGCGTCGC	6316
6153	ACGCAGCG G CGCGCGUC	1520	GACGCGCG GGCTAGCTACAACGA CGCTGCGT	6317
6155	GCAGCGGC G CGCGUCAC	1521	GTGACGCG GGCTAGCTACAACGA GCCGCTGC	6318
6157	AGCGGCGC G CGUCACAC	1522	GTGTGACG GGCTAGCTACAACGA GCGCCGCT	6319
6159	CGGCGCGC G UCACACAA	1523	TTGTGTGA GGCTAGCTACAACGA GCGCGCCG	6320
6162	CGCGCGUC A CACAAAUC	1524	GATTTGTG GGCTAGCTACAACGA GACGCGCG	6321
6164	CGCGUCAC A CAAAUCCU	1525	AGGATTTG GGCTAGCTACAACGA GTGACGCG	6322
6168	UCACACAA A UCCUCUCC	1526	GGAGAGGA GGCTAGCTACAACGA TTGTGTGA	6323
6178	CCUCUCCA G CCUCACCA	1527	TGGTGAGG GGCTAGCTACAACGA TGGAGAGG	6324
6183	CCAGCCUC A CCAUCACU	1528	AGTGATGG GGCTAGCTACAACGA GAGGCTGG	6325
6186	GCCUCACC A UCACUCAG	1529	CTGAGTGA GGCTAGCTACAACGA GGTGAGGC	6326
6189	UCACCAUC A CUCAGCUG	1530	CAGCTGAG GGCTAGCTACAACGA GATGGTGA	6327
6194	AUCACUCA G CUGCUGAG	1531	CTCAGCAG GGCTAGCTACAACGA TGAGTGAT	6328
6197	ACUCAGCU G CUGAGGAG	1532	CTCCTCAG GGCTAGCTACAACGA AGCTGAGT	6329
6206	CUGAGGAG G CUCCAUCA	1533	TGATGGAG GGCTAGCTACAACGA CTCCTCAG	6330
6211	GAGGCUCC A UCAGUGGA	1534	TCCACTGA GGCTAGCTACAACGA GGAGCCTC	6331

6215	CUCCAUCA G UGGAUCAA	1535	TTGATCCA GGCTAGCTACAACGA TGATGGAG	6332
6219	AUCAGUGG A UCAAUGAG	1536	CTCATTGA GGCTAGCTACAACGA CCACTGAT	6333
6223	GUGGAUCA A UGAGGACU	1537	AGTCCTCA GGCTAGCTACAACGA TGATCCAC	6334
6229	CAAUGAGG A CUGCUCCA	1538	TGGAGCAG GGCTAGCTACAACGA CCTCATTG	6335
6232	UGAGGACU G CUCCACGC	1539	GCGTGGAG GGCTAGCTACAACGA AGTCCTCA	6336
6237	ACUGCUCC A CGCCAUGU	1540	ACATGGCG GGCTAGCTACAACGA GGAGCAGT	6337
6239	UGCUCCAC G CCAUGUUC	1541	GAACATGG GGCTAGCTACAACGA GTGGAGCA	6338
6242	UCCACGCC A UGUUCCGG	1542	CCGGAACA GGCTAGCTACAACGA GGCGTGGA	6339
6244	CACGCCAU G UUCCGGCU	1543	AGCCGGAA GGCTAGCTACAACGA ATGGCGTG	6340
6250	AUGUUCCG G CUCGUGGC	1544	GCCACGAG GGCTAGCTACAACGA CGGAACAT	6341
6254	UCCGGCUC G UGGCUAAG	1545	CTTAGCCA GGCTAGCTACAACGA GAGCCGGA	6342
6257	GGCUCGUG G CUAAGGGA	1546	TCCCTTAG GGCTAGCTACAACGA CACGAGCC	6343
6265	GCUAAGGG A UGUUUGGG	1547	CCCAAACA GGCTAGCTACAACGA CCCTTAGC	6344
6267	UAAGGGAU G UUUGGGAC	1548	GTCCCAAA GGCTAGCTACAACGA ATCCCTTA	6345
6274	UGUUUGGG A CUGGAUAU	1549	ATATCCAG GGCTAGCTACAACGA CCCAAACA	6346
6279	GGGACUGG A UAUGCACG	1550	CGTGCATA GGCTAGCTACAACGA CCAGTCCC	6347
6281	GACUGGAU A UGCACGGU	1551	ACCGTGCA GGCTAGCTACAACGA ATCCAGTC	6348
6283	CUGGAUAU G CACGGUGU	1552	ACACCGTG GGCTAGCTACAACGA ATATCCAG	6349
6285	GGAUAUGC A CGGUGUUG	1553	CAACACCG GGCTAGCTACAACGA GCATATCC	6350
6288	UAUGCACG G UGUUGACU	1554	AGTCAACA GGCTAGCTACAACGA CGTGCATA	6351
6290	UGCACGGU G UUGACUGA	1555	TCAGTCAA GGCTAGCTACAACGA ACCGTGCA	6352
6294	CGGUGUUG A CUGACUUC	1556	GAAGTCAG GGCTAGCTACAACGA CAACACCG	6353
6298	GUUGACUG A CUUCAAGA	1557	TCTTGAAG GGCTAGCTACAACGA CAGTCAAC	6354
6306	ACUUCAAG A CCUGGCUU	1558	AAGCCAGG GGCTAGCTACAACGA CTTGAAGT	6355
6311	AAGACCUG G CUUCAGUC	1559	GACTGAAG GGCTAGCTACAACGA CAGGTCTT	6356
6317	UGGCUUCA G UCCAAGCU	1560	AGCTTGGA GGCTAGCTACAACGA TGAAGCCA	6357
6323	CAGUCCAA G CUCCUGCC	1561	GGCAGGAG GGCTAGCTACAACGA TTGGACTG	6358
6329	AAGCUCCU G CCGCGGUU	1562	AACCGCGG GGCTAGCTACAACGA AGGAGCTT	6359
6332	CUCCUGCC G CGGUUGCC	1563	GGCAACCG GGCTAGCTACAACGA GGCAGGAG	6360
6335	CUGCCGCG G UUGCCGGG	1564	CCCGGCAA GGCTAGCTACAACGA CGCGGCAG	6361
6338	CCGCGGUU G CCGGGAGU	1565	ACTCCCGG GGCTAGCTACAACGA AACCGCGG	6362
6345	UGCCGGGA G UCCCUUUC	1566	GAAAGGGA GGCTAGCTACAACGA TCCCGGCA	6363
6359	UUCUUCUC A UGCCAACG	1567	CGTTGGCA GGCTAGCTACAACGA GAGAAGAA	6364
6361	CUUCUCAU G CCAACGUG	1568	CACGTTGG GGCTAGCTACAACGA ATGAGAAG	6365
6365	UCAUGCCA A CGUGGGUA	1569	TACCCACG GGCTAGCTACAACGA TGGCATGA	6366
6367	AUGCCAAC G UGGGUACA	1570	TGTACCCA GGCTAGCTACAACGA GTTGGCAT	6367
6371	CAACGUGG G UACAGGGG	1571	CCCCTGTA GGCTAGCTACAACGA CCACGTTG	6368
6373	ACGUGGGU A CAGGGGGG	1572	CCCCCCTG GGCTAGCTACAACGA ACCCACGT	6369
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6386	GGGGUCUG G CGGGGAGA	1574	TCTCCCCG GGCTAGCTACAACGA CAGACCCC	6371
6394	GCGGGGAG A CGGUAUCA	1575	TGATACCG GGCTAGCTACAACGA CTCCCCGC	6372
6397	GGGAGACG G UAUCAUGC	1576	GCATGATA GGCTAGCTACAACGA CGTCTCCC	6373
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6402	ACGGUAUC A UGCAAACC	1578	GGTTTGCA GGCTAGCTACAACGA GATACCGT	6375
6404	GGUAUCAU G CAAACCAC	1579	GTGGTTTG GGCTAGCTACAACGA ATGATACC	6376
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6419	ACCUGCCC A UGCGGAGC	1583	GCTCCGCA GGCTAGCTACAACGA GGGCAGGT	6380
6421	CUGCCCAU G CGGAGCGC	1584	GCGCTCCG GGCTAGCTACAACGA ATGGGCAG	6381
6426	CAUGCGGA G CGCAGAUC	1585	GATCTGCG GGCTAGCTACAACGA TCCGCATG	6382
6428	UGCGGAGC G CAGAUCAC	1586	GTGATCTG GGCTAGCTACAACGA GCTCCGCA	6383
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6435	CGCAGAUC A CUGGACAU	1588	ATGTCCAG GGCTAGCTACAACGA GATCTGCG	6385
6440	AUCACUGG A CAUGUCAA	1589	TTGACATG GGCTAGCTACAACGA CCAGTGAT	6386
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6517	CCCCAUCA A CGCAUACA	1609	TGTATGCG GGCTAGCTACAACGA TGATGGGG	6406
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6892	GGCUAAGC G UAGGCUGG	1704	CCAGCCTA GGCTAGCTACAACGA GCTTAGCC	6501
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6924	CCUCCUUG G CCAGCUCC	1708	GGAGCTGG GGCTAGCTACAACGA CAAGGAGG	6505
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7008	UUGACCUC A UCGAGGCC	1727	GGCCTCGA GGCTAGCTACAACGA GAGGTCAA	6524
7014	UCAUCGAG G CCAACCUC	1728	GAGGTTGG GGCTAGCTACAACGA CTCGATGA	6525
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7028	CUCCUGUG G CGGCAGGA	1731	TCCTGCCG GGCTAGCTACAACGA CACAGGAG	6528
7031	CUGUGGCG G CAGGAGAU	1732	ATCTCCTG GGCTAGCTACAACGA CGCCACAG	6529
7038	GGCAGGAG A UGGGCGGU	1733	ACCGCCCA GGCTAGCTACAACGA CTCCTGCC	6530
7042	GGAGAUGG G CGGUAACA	1734	TGTTACCG GGCTAGCTACAACGA CCATCTCC	6531
7045	GAUGGGCG G UAACAUCA	1735	TGATGTTA GGCTAGCTACAACGA CGCCCATC	6532
7048	GGGCGGUA A CAUCACUC	1736	GAGTGATG GGCTAGCTACAACGA TACCGCCC	6533
7050	GCGGUAAC A UCACUCGC	1737	GCGAGTGA GGCTAGCTACAACGA GTTACCGC	6534
7053	GUAACAUC A CUCGCGUG	1738	CACGCGAG GGCTAGCTACAACGA GATGTTAC	6535
7057	CAUCACUC G CGUGGAGU	1739	ACTCCACG GGCTAGCTACAACGA GAGTGATG	6536
7059	UCACUCGC G UGGAGUCA	1740	TGACTCCA GGCTAGCTACAACGA GCGAGTGA	6537
7064	CGCGUGGA G UCAGAGAA	1741	TTCTCTGA GGCTAGCTACAACGA TCCACGCG	6538
7072	GUCAGAGA A UAAGGUAG	1742	CTACCTTA GGCTAGCTACAACGA TCTCTGAC	6539
7077	AGAAUAAG G UAGUUACC	1743	GGTAACTA GGCTAGCTACAACGA CTTATTCT	6540
7080	AUAAGGUA G UUACCCUG	1744	CAGGGTAA GGCTAGCTACAACGA TACCTTAT	6541
7083	AGGUAGUU A CCCUGGAC	1745	GTCCAGGG GGCTAGCTACAACGA AACTACCT	6542
7090	UACCCUGG A CUCUUUUG	1746	CAAAAGAG GGCTAGCTACAACGA CCAGGGTA	6543
7099	CUCUUUUG A CCCGCUUC	1747	GAAGCGGG GGCTAGCTACAACGA CAAAAGAG	6544
7103	UUUGACCC G CUUCGAGC	1748	GCTCGAAG GGCTAGCTACAACGA GGGTCAAA	6545
7110	CGCUUCGA G CGGAGGAG	1749	CTCCTCCG GGCTAGCTACAACGA TCGAAGCG	6546
7120	GGAGGAGG A UGAGAGAG	1750	CTCTCTCA GGCTAGCTACAACGA CCTCCTCC	6547
7131	AGAGAGAG G UGUCCAUU	1751	AATGGACA GGCTAGCTACAACGA CTCTCTCT	6548
7133	AGAGAGGU G UCCAUUCC	1752	GGAATGGA GGCTAGCTACAACGA ACCTCTCT	6549
7137	AGGUGUCC A UUCCGGCG	1753	CGCCGGAA GGCTAGCTACAACGA GGACACCT	6550
7143	CCAUUCCG G CGGAGAUC	1754	GATCTCCG GGCTAGCTACAACGA CGGAATGG	6551
7149	CGGCGGAG A UCCUGCGG	1755	CCGCAGGA GGCTAGCTACAACGA CTCCGCCG	6552
7154	GAGAUCCU G CGGAAAUC	1756	GATTTCCG GGCTAGCTACAACGA AGGATCTC	6553
7160	CUGCGGAA A UCCAAGAA	1757	TTCTTGGA GGCTAGCTACAACGA TTCCGCAG	6554
7169	UCCAAGAA G UUUCCUUC	1758	GAAGGAAA GGCTAGCTACAACGA TTCTTGGA	6555
7179	UUCCUUCA G CGUUACCC	1759	GGGTAACG GGCTAGCTACAACGA TGAAGGAA	6556
7181	CCUUCAGC G UUACCCAU	1760	ATGGGTAA GGCTAGCTACAACGA GCTGAAGG	6557
7184	UCAGCGUU A CCCAUAUG	1761	CATATGGG GGCTAGCTACAACGA AACGCTGA	6558
7188	CGUUACCC A UAUGGGCA	1762	TGCCCATA GGCTAGCTACAACGA GGGTAACG	6559

7190	UUACCCAU A UGGGCACG	1763	CGTGCCCA GGCTAGCTACAACGA ATGGGTAA	6560
7194	CCAUAUGG G CACGCCCG	1764	CGGGCGTG GGCTAGCTACAACGA CCATATGG	6561
7196	AUAUGGGC A CGCCCGGA	1765	TCCGGGCG GGCTAGCTACAACGA GCCCATAT	6562
7198	AUGGGCAC G CCCGGAUU	1766	AATCCGGG GGCTAGCTACAACGA GTGCCCAT	6563
7204	ACGCCCGG A UUACAACC	1767	GGTTGTAA GGCTAGCTACAACGA CCGGGCGT	6564
7207	CCCGGAUU A CAACCCUC	1768	GAGGGTTG GGCTAGCTACAACGA AATCCGGG	6565
7210	GGAUUACA A CCCUCCAC	1769	GTGGAGGG GGCTAGCTACAACGA TGTAATCC	6566
7217	AACCCUCC A CUACUAGA	1770	TCTAGTAG GGCTAGCTACAACGA GGAGGGTT	6567
7220	CCUCCACU A CUAGAGCC	1771	GGCTCTAG GGCTAGCTACAACGA AGTGGAGG	6568
7226	CUACUAGA G CCCUGGAA	1772	TTCCAGGG GGCTAGCTACAACGA TCTAGTAG	6569
7237	CUGGAAAG A CCCAGACU	1773	AGTCTGGG GGCTAGCTACAACGA CTTTCCAG	6570
7243	AGACCCAG A CUACGUCC	1774	GGACGTAG GGCTAGCTACAACGA CTGGGTCT	6571
7246	CCCAGACU A CGUCCCUC	1775	GAGGGACG GGCTAGCTACAACGA AGTCTGGG	6572
7248	CAGACUAC G UCCCUCCG	1776	CGGAGGGA GGCTAGCTACAACGA GTAGTCTG	6573
7257	UCCCUCCG G UGGUACAC	1777	GTGTACCA GGCTAGCTACAACGA CGGAGGGA	6574
7260	CUCCGGUG G UACACGGG	1778	CCCGTGTA GGCTAGCTACAACGA CACCGGAG	6575
7262	CCGGUGGU A CACGGGUG	1779	CACCCGTG GGCTAGCTACAACGA ACCACCGG	6576
7264	GGUGGUAC A CGGGUGCC	1780	GGCACCCG GGCTAGCTACAACGA GTACCACC	6577
7268	GUACACGG G UGCCCAUU	1781	AATGGGCA GGCTAGCTACAACGA CCGTGTAC	6578
7270	ACACGGGU G CCCAUUGC	1782	GCAATGGG GGCTAGCTACAACGA ACCCGTGT	6579
7274	GGGUGCCC A UUGCCACC	1783	GGTGGCAA GGCTAGCTACAACGA GGGCACCC	6580
7277	UGCCCAUU G CCACCUGC	1784	GCAGGTGG GGCTAGCTACAACGA AATGGGCA	6581
7280	CCAUUGCC A CCUGCCAA	1785	TTGGCAGG GGCTAGCTACAACGA GGCAATGG	6582
7284	UGCCACCU G CCAAGGCC	1786	GGCCTTGG GGCTAGCTACAACGA AGGTGGCA	6583
7290	CUGCCAAG G CCCCUCCA	1787	TGGAGGGG GGCTAGCTACAACGA CTTGGCAG	6584
7299	CCCCUCCA A UACCACCU	1788	AGGTGGTA GGCTAGCTACAACGA TGGAGGGG	6585
7301	CCUCCAAU A CCACCUCC	1789	GGAGGTGG GGCTAGCTACAACGA ATTGGAGG	6586
7304	CCAAUACC A CCUCCACG	1790	CGTGGAGG GGCTAGCTACAACGA GGTATTGG	6587
7310	CCACCUCC A CGGAGGAA	1791	TTCCTCCG GGCTAGCTACAACGA GGAGGTGG	6588
7323	GGAAGAGG A CGGUUGUU	1792	AACAACCG GGCTAGCTACAACGA CCTCTTCC	6589
7326	AGAGGACG G UUGUUCUG	1793	CAGAACAA GGCTAGCTACAACGA CGTCCTCT	6590
7329	GGACGGUU G UUCUGACA	1794	TGTCAGAA GGCTAGCTACAACGA AACCGTCC	6591
7335	UUGUUCUG A CAGAGUCC	1795	GGACTCTG GGCTAGCTACAACGA CAGAACAA	6592
7340	CUGACAGA G UCCACCGU	1796	ACGGTGGA GGCTAGCTACAACGA TCTGTCAG	6593
7344	CAGAGUCC A CCGUGUCU	1797	AGACACGG GGCTAGCTACAACGA GGACTCTG	6594
7347	AGUCCACC G UGUCUUCU	1798	AGAAGACA GGCTAGCTACAACGA GGTGGACT	6595
7349	UCCACCGU G UCUUCUGC	1799	GCAGAAGA GGCTAGCTACAACGA ACGGTGGA	6596
7356	UGUCUUCU G CCUUGGCG	1800	CGCCAAGG GGCTAGCTACAACGA AGAAGACA	6597
7362	CUGCCUUG G CGGAGCUC	1801	GAGCTCCG GGCTAGCTACAACGA CAAGGCAG	6598
7367	UUGGCGGA G CUCGCCAC	1802	GTGGCGAG GGCTAGCTACAACGA TCCGCCAA	6599
7371	CGGAGCUC G CCACAAAG	1803	CTTTGTGG GGCTAGCTACAACGA GAGCTCCG	6600
7374	AGCUCGCC A CAAAGACC	1804	GGTCTTTG GGCTAGCTACAACGA GGCGAGCT	6601
7380	CCACAAAG A CCUUCGGC	1805	GCCGAAGG GGCTAGCTACAACGA CTTTGTGG	6602
7387	GACCUUCG G CAGCUCUG	1806	CAGAGCTG GGCTAGCTACAACGA CGAAGGTC	6603
7390	CUUCGGCA G CUCUGAAU	1807	ATTCAGAG GGCTAGCTACAACGA TGCCGAAG	6604
7397	AGCUCUGA A UCAUCGGC	1808	GCCGATGA GGCTAGCTACAACGA TCAGAGCT	6605
7400	UCUGAAUC A UCGGCCGC	1809	GCGGCCGA GGCTAGCTACAACGA GATTCAGA	6606
7404	AAUCAUCG G CCGCUGAU	1810	ATCAGCGG GGCTAGCTACAACGA CGATGATT	6607
7407	CAUCGGCC G CUGAUAGA	1811	TCTATCAG GGCTAGCTACAACGA GGCCGATG	6608
7411	GGCCGCUG A UAGAGGUA	1812	TACCTCTA GGCTAGCTACAACGA CAGCGGCC	6609
7417	UGAUAGAG G UACGGCAA	1813	TTGCCGTA GGCTAGCTACAACGA CTCTATCA	6610
7419	AUAGAGGU A CGGCAACC	1814	GGTTGCCG GGCTAGCTACAACGA ACCTCTAT	6611
7422	GAGGUACG G CAACCGCC	1815	GGCGGTTG GGCTAGCTACAACGA CGTACCTC	6612
7425	GUACGGCA A CCGCCCCC	1816	GGGGGCGG GGCTAGCTACAACGA TGCCGTAC	6613
7428	CGGCAACC G CCCCCCCC	1817	GGGGGGGG GGCTAGCTACAACGA GGTTGCCG	6614
7438	CCCCCCCG A CCAGACCU	1818	AGGTCTGG GGCTAGCTACAACGA CGGGGGGG	6615
7443	CCGACCAG A CCUCCAAU	1819	ATTGGAGG GGCTAGCTACAACGA CTGGTCGG	6616

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7453	CUCCAAUG A CGGUGACG	1821	CGTCACCG GGCTAGCTACAACGA CATTGGAG	6618
7456	CAAUGACG G UGACGCAG	1822	CTGCGTCA GGCTAGCTACAACGA CGTCATTG	6619
7459	UGACGGUG A CGCAGGAU	1823	ATCCTGCG GGCTAGCTACAACGA CACCGTCA	6620
7461	ACGGUGAC G CAGGAUCC	1824	GGATCCTG GGCTAGCTACAACGA GTCACCGT	6621
7466	GACGCAGG A UCCGACGU	1825	ACGTCGGA GGCTAGCTACAACGA CCTGCGTC	6622
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7473	GAUCCGAC G UUGAGUCG	1827	CGACTCAA GGCTAGCTACAACGA GTCGGATC	6624
7478	GACGUUGA G UCGUACUC	1828	GAGTACGA GGCTAGCTACAACGA TCAACGTC	6625
7481	GUUGAGUC G UACUCCUC	1829	GAGGAGTA GGCTAGCTACAACGA GACTCAAC	6626
7483	UGAGUCGU A CUCCUCUA	1830	TAGAGGAG GGCTAGCTACAACGA ACGACTCA	6627
7491	ACUCCUCU A UGCCCCCC	1831	GGGGGGCA GGCTAGCTACAACGA AGAGGAGT	6628
7493	UCCUCUAU G CCCCCCCU	1832	AGGGGGGG GGCTAGCTACAACGA ATAGAGGA	6629
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7525	GGAUCCCG A UCUCAGCG	1835	CGCTGAGA GGCTAGCTACAACGA CGGGATCC	6632
7531	CGAUCUCA G CGACGGGU	1836	ACCCGTCG GGCTAGCTACAACGA TGAGATCG	6633
7534	UCUCAGCG A CGGGUCUU	1837	AAGACCCG GGCTAGCTACAACGA CGCTGAGA	6634
7538	AGCGACGG G UCUUGGUC	1838	GACCAAGA GGCTAGCTACAACGA CCGTCGCT	6635
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7551	GGUCUACC G UGAGCGAA	1841	TTCGCTCA GGCTAGCTACAACGA GGTAGACC	6638
7555	UACCGUGA G CGAAGAGG	1842	CCTCTTCG GGCTAGCTACAACGA TCACGGTA	6639
7563	GCGAAGAG G CUGGCGAG	1843	CTCGCCAG GGCTAGCTACAACGA CTCTTCGC	6640
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7573	UGGCGAGG A UGUCGUCU	1845	AGACGACA GGCTAGCTACAACGA CCTCGCCA	6642
7575	GCGAGGAU G UCGUCUGC	1846	GCAGACGA GGCTAGCTACAACGA ATCCTCGC	6643
7578	AGGAUGUC G UCUGCUGC	1847	GCAGCAGA GGCTAGCTACAACGA GACATCCT	6644
7582	UGUCGUCU G CUGCUCGA	1848	TCGAGCAG GGCTAGCTACAACGA AGACGACA	6645
7585	CGUCUGCU G CUCGAUGU	1849	ACATCGAG GGCTAGCTACAACGA AGCAGACG	6646
7590	GCUGCUCG A UGUCCUAC	1850	GTAGGACA GGCTAGCTACAACGA CGAGCAGC	6647
7592	UGCUCGAU G UCCUACAC	1851	GTGTAGGA GGCTAGCTACAACGA ATCGAGCA	6648
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7609	AUGGACGG G CGCCCUGA	1856	TCAGGGCG GGCTAGCTACAACGA CCGTCCAT	6653
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7617	GCGCCCUG A UCACGCCA	1858	TGGCGTGA GGCTAGCTACAACGA CAGGGCGC	6655
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7622	CUGAUCAC G CCAUGCGC	1860	GCGCATGG GGCTAGCTACAACGA GTGATCAG	6657
7625	AUCACGCC A UGCGCUGC	1861	GCAGCGCA GGCTAGCTACAACGA GGCGTGAT	6658
7627	CACGCCAU G CGCUGCGG	1862	CCGCAGCG GGCTAGCTACAACGA ATGGCGTG	6659
7629	CGCCAUGC G CUGCGGAG	1863	CTCCGCAG GGCTAGCTACAACGA GCATGGCG	6660
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7642	GGAGGAAA G CAAGUUGC	1865	GCAACTTG GGCTAGCTACAACGA TTTCCTCC	6662
7646	GAAAGCAA G UUGCCCAU	1866	ATGGGCAA GGCTAGCTACAACGA TTGCTTTC	6663
7649	AGCAAGUU G CCCAUCAA	1867	TTGATGGG GGCTAGCTACAACGA AACTTGCT	6664
7653	AGUUGCCC A UCAACGCG	1868	CGCGTTGA GGCTAGCTACAACGA GGGCAACT	6665
7657	GCCCAUCA A CGCGUUGA	1869	TCAACGCG GGCTAGCTACAACGA TGATGGGC	6666
7659	CCAUCAAC G CGUUGAGC	1870	GCTCAACG GGCTAGCTACAACGA GTTGATGG	6667
7661	AUCAACGC G UUGAGCAA	1871	TTGCTCAA GGCTAGCTACAACGA GCGTTGAT	6668
7666	CGCGUUGA G CAACUCUU	1872	AAGAGTTG GGCTAGCTACAACGA TCAACGCG	6669
7669	GUUGAGCA A CUCUUUGC	1873	GCAAAGAG GGCTAGCTACAACGA TGCTCAAC	6670
7676	AACUCUUU G CUGCGUCA	1874	TGACGCAG GGCTAGCTACAACGA AAAGAGTT	6671
7679	UCUUUGCU G CGUCACCA	1875	TGGTGACG GGCTAGCTACAACGA AGCAAAGA	6672
7681	UUUGCUGC G UCACCACA	1876	TGTGGTGA GGCTAGCTACAACGA GCAGCAAA	6673

7684	GCUGCGUC A CCACAACA	1877	TGTTGTGG GGCTAGCTACAACGA GACGCAGC	6674
7687	GCGUCACC A CAACAUGG	1878	CCATGTTG GGCTAGCTACAACGA GGTGACGC	6675
7690	UCACCACA A CAUGGUCU	1879	AGACCATG GGCTAGCTACAACGA TGTGGTGA	6676
7692	ACCACAAC A UGGUCUAC	1880	GTAGACCA GGCTAGCTACAACGA GTTGTGGT	6677
7695	ACAACAUG G UCUACGCU	1881	AGCGTAGA GGCTAGCTACAACGA CATGTTGT	6678
7699	CAUGGUCU A CGCUACAA	1882	TTGTAGCG GGCTAGCTACAACGA AGACCATG	6679
7701	UGGUCUAC G CUACAACA	1883	TGTTGTAG GGCTAGCTACAACGA GTAGACCA	6680
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7707	ACGCUACA A CAUCUCGC	1885	GCGAGATG GGCTAGCTACAACGA TGTAGCGT	6682
7709	GCUACAAC A UCUCGCAG	1886	CTGCGAGA GGCTAGCTACAACGA GTTGTAGC	6683
7714	AACAUCUC G CAGCGCAA	1887	TTGCGCTG GGCTAGCTACAACGA GAGATGTT	6684
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7719	CUCGCAGC G CAAGCCAG	1889	CTGGCTTG GGCTAGCTACAACGA GCTGCGAG	6686
7723	CAGCGCAA G CCAGCGGC	1890	GCCGCTGG GGCTAGCTACAACGA TTGCGCTG	6687
7727	GCAAGCCA G CGGCAGAA	1891	TTCTGCCG GGCTAGCTACAACGA TGGCTTGC	6688
7730	AGCCAGCG G CAGAAGAA	1892	TTCTTCTG GGCTAGCTACAACGA CGCTGGCT	6689
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7743	AGAAGGUC A CCUUUGAC	1894	GTCAAAGG GGCTAGCTACAACGA GACCTTCT	6691
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7761	GACUGCAA G UCCUGGAC	1898	GTCCAGGA GGCTAGCTACAACGA TTGCAGTC	6695
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7785	ACCGGGAC G UGCUCAAG	1904	CTTGAGCA GGCTAGCTACAACGA GTCCCGGT	6701
7787	CGGGACGU G CUCAAGGA	1905	TCCTTGAG GGCTAGCTACAACGA ACGTCCCG	6702
7797	UCAAGGAG A UGAAGGCG	1906	CGCCTTCA GGCTAGCTACAACGA CTCCTTGA	6703
7803	AGAUGAAG G CGAAGGCG	1907	CGCCTTCG GGCTAGCTACAACGA CTTCATCT	6704
7809	AGGCGAAG G CGUCCACA	1908	TGTGGACG GGCTAGCTACAACGA CTTCGCCT	6705
7811	GCGAAGGC G UCCACAGU	1909	ACTGTGGA GGCTAGCTACAACGA GCCTTCGC	6706
7815	AGGCGUCC A CAGUUAAG	1910	CTTAACTG GGCTAGCTACAACGA GGACGCCT	6707
7818	CGUCCACA G UUAAGGCU	1911	AGCCTTAA GGCTAGCTACAACGA TGTGGACG	6708
7824	CAGUUAAG G CUAAACUU	1912	AAGTTTAG GGCTAGCTACAACGA CTTAACTG	6709
7829	AAGGCUAA A CUUCUAUC	1913	GATAGAAG GGCTAGCTACAACGA TTAGCCTT	6710
7835	AAACUUCU A UCCGUAGA	1914	TCTACGGA GGCTAGCTACAACGA AGAAGTTT	6711
7839	UUCUAUCC G UAGAGGAA	1915	TTCCTCTA GGCTAGCTACAACGA GGATAGAA	6712
7848	UAGAGGAA G CCUGCAGA	1916	TCTGCAGG GGCTAGCTACAACGA TTCCTCTA	6713
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7856	GCCUGCAG A CUGACGCC	1918	GGCGTCAG GGCTAGCTACAACGA CTGCAGGC	6715
7860	GCAGACUG A CGCCCCCA	1919	TGGGGGCG GGCTAGCTACAACGA CAGTCTGC	6716
7862	AGACUGAC G CCCCCACA	1920	TGTGGGGG GGCTAGCTACAACGA GTCAGTCT	6717
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7870	GCCCCCAC A UUCGGCCA	1922	TGGCCGAA GGCTAGCTACAACGA GTGGGGGC	6719
7875	CACAUUCG G CCAGGUCC	1923	GGACCTGG GGCTAGCTACAACGA CGAATGTG	6720
7880	UCGGCCAG G UCCAAAUU	1924	AATTTGGA GGCTAGCTACAACGA CTGGCCGA	6721
7886	AGGUCCAA A UUUGGUUA	1925	TAACCAAA GGCTAGCTACAACGA TTGGACCT	6722
7891	CAAAUUUG G UUAUGGGG	1926	CCCCATAA GGCTAGCTACAACGA CAAATTTG	6723
7894	AUUUGGUU A UGGGGCAA	1927	TTGCCCCA GGCTAGCTACAACGA AACCAAAT	6724
7899	GUUAUGGG G CAAAGGAC	1928	GTCCTTTG GGCTAGCTACAACGA CCCATAAC	6725
7906	GGCAAAGG A CGUCCGGA	1929	TCCGGACG GGCTAGCTACAACGA CCTTTGCC	6726
7908	CAAAGGAC G UCCGGAAC	1930	GTTCCGGA GGCTAGCTACAACGA GTCCTTTG	6727
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7919	CGGAACCU A UCCAGCGG	1932	CCGCTGGA GGCTAGCTACAACGA AGGTTCCG	6729
7924	CCUAUCCA G CGGGGCCG	1933	CGGCCCCG GGCTAGCTACAACGA TGGATAGG	6730

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7932	GCGGGGCC G UCAACCAC	1935	GTGGTTGA GGCTAGCTACAACGA GGCCCCGC	6732
7936	GGCCGUCA A CCACAUCC	1936	GGATGTGG GGCTAGCTACAACGA TGACGGCC	6733
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7945	CCACAUCC G CUCCGUGU	1939	ACACGGAG GGCTAGCTACAACGA GGATGTGG	6736
7950	UCCGCUCC G UGUGGAAG	1940	CTTCCACA GGCTAGCTACAACGA GGAGCGGA	6737
7952	CGCUCCGU G UGGAAGGA	1941	TCCTTCCA GGCTAGCTACAACGA ACGGAGCG	6738
7960	GUGGAAGG A CUUGCUGG	1942	CCAGCAAG GGCTAGCTACAACGA CCTTCCAC	6739
7964	AAGGACUU G CUGGAAGA	1943	TCTTCCAG GGCTAGCTACAACGA AAGTCCTT	6740
7972	GCUGGAAG A CACUGAGA	1944	TCTCAGTG GGCTAGCTACAACGA CTTCCAGC	6741
7974	UGGAAGAC A CUGAGACA	1945	TGTCTCAG GGCTAGCTACAACGA GTCTTCCA	6742
7980	ACACUGAG A CACCAAUU	1946	AATTGGTG GGCTAGCTACAACGA CTCAGTGT	6743
7982	ACUGAGAC A CCAAUUGA	1947	TCAATTGG GGCTAGCTACAACGA GTCTCAGT	6744
7986	AGACACCA A UUGAUACC	1948	GGTATCAA GGCTAGCTACAACGA TGGTGTCT	6745
7990	ACCAAUUG A UACCACCA	1949	TGGTGGTA GGCTAGCTACAACGA CAATTGGT	6746
7992	CAAUUGAU A CCACCAUC	1950	GATGGTGG GGCTAGCTACAACGA ATCAATTG	6747
7995	UUGAUACC A CCAUCAUG	1951	CATGATGG GGCTAGCTACAACGA GGTATCAA	6748
7998	AUACCACC A UCAUGGCA	1952	TGCCATGA GGCTAGCTACAACGA GGTGGTAT	6749
8001	CCACCAUC A UGGCAAAA	1953	TTTTGCCA GGCTAGCTACAACGA GATGGTGG	6750
8004	CCAUCAUG G CAAAAAAU	1954	ATTTTTTG GGCTAGCTACAACGA CATGATGG	6751
8011	GGCAAAAA A UGAGGUUU	1955	AAACCTCA GGCTAGCTACAACGA TTTTTGCC	6752
8016	AAAAUGAG G UUUUCUGC	1956	GCAGAAAA GGCTAGCTACAACGA CTCATTTT	6753
8023	GGUUUUCU G CGUCCAAC	1957	GTTGGACG GGCTAGCTACAACGA AGAAAACC	6754
8025	UUUUCUGC G UCCAACCA	1958	TGGTTGGA GGCTAGCTACAACGA GCAGAAAA	6755
8030	UGCGUCCA A CCAGAGAA	1959	TTCTCTGG GGCTAGCTACAACGA TGGACGCA	6756
8044	GAAAGGAG G CCGCAAGC	1960	GCTTGCGG GGCTAGCTACAACGA CTCCTTTC	6757
8047	AGGAGGCC G CAAGCCAG	1961	CTGGCTTG GGCTAGCTACAACGA GGCCTCCT	6758
8051	GGCCGCAA G CCAGCUCG	1962	CGAGCTGG GGCTAGCTACAACGA TTGCGGCC	6759
8055	GCAAGCCA G CUCGCCUU	1963	AAGGCGAG GGCTAGCTACAACGA TGGCTTGC	6760
8059	GCCAGCUC G CCUUAUCG	1964	CGATAAGG GGCTAGCTACAACGA GAGCTGGC	6761
8064	CUCGCCUU A UCGUGUUC	1965	GAACACGA GGCTAGCTACAACGA AAGGCGAG	6762
8067	GCCUUAUC G UGUUCCCA	1966	TGGGAACA GGCTAGCTACAACGA GATAAGGC	6763
8069	CUUAUCGU G UUCCCAGA	1967	TCTGGGAA GGCTAGCTACAACGA ACGATAAG	6764
8077	GUUCCCAG A CUUGGGGG	1968	CCCCCAAG GGCTAGCTACAACGA CTGGGAAC	6765
8085	ACUUGGGG G UUCGUGUG	1969	CACACGAA GGCTAGCTACAACGA CCCCAAGT	6766
8089	GGGGGUUC G UGUGUGCG	1970	CGCACACA GGCTAGCTACAACGA GAACCCCC	6767
8091	GGGUUCGU G UGUGCGAG	1971	CTCGCACA GGCTAGCTACAACGA ACGAACCC	6768
8093	GUUCGUGU G UGCGAGAA	1972	TTCTCGCA GGCTAGCTACAACGA ACACGAAC	6769
8095	UCGUGUGU G CGAGAAAA	1973	TTTTCTCG GGCTAGCTACAACGA ACACACGA	6770
8103	GCGAGAAA A UGGCCCUU	1974	AAGGGCCA GGCTAGCTACAACGA TTTCTCGC	6771
8106	AGAAAAUG G CCCUUUAC	1975	GTAAAGGG GGCTAGCTACAACGA CATTTTCT	6772
8113	GGCCCUUU A CGACGUGG	1976	CCACGTCG GGCTAGCTACAACGA AAAGGGCC	6773
8116	CCUUUACG A CGUGGUCU	1977	AGACCACG GGCTAGCTACAACGA CGTAAAGG	6774
8118	UUUACGAC G UGGUCUCC	1978	GGAGACCA GGCTAGCTACAACGA GTCGTAAA	6775
8121	ACGACGUG G UCUCCACC	1979	GGTGGAGA GGCTAGCTACAACGA CACGTCGT	6776
8127	UGGUCUCC A CCCUUCCU	1980	AGGAAGGG GGCTAGCTACAACGA GGAGACCA	6777
8139	UUCCUCAG G CCGUGAUG	1981	CATCACGG GGCTAGCTACAACGA CTGAGGAA	6778
8142	CUCAGGCC G UGAUGGGC	1982	GCCCATCA GGCTAGCTACAACGA GGCCTGAG	6779
8145	AGGCCGUG A UGGGCUCU	1983	AGAGCCCA GGCTAGCTACAACGA CACGGCCT	6780
8149	CGUGAUGG G CUCUUCAU	1984	ATGAAGAG GGCTAGCTACAACGA CCATCACG	6781
8156	GGCUCUUC A UACGGAUU	1985	AATCCGTA GGCTAGCTACAACGA GAAGAGCC	6782
8158	CUCUUCAU A CGGAUUCC	1986	GGAATCCG GGCTAGCTACAACGA ATGAAGAG	6783
8162	UCAUACGG A UUCCAGUA	1987	TACTGGAA GGCTAGCTACAACGA CCGTATGA	6784
8168	GGAUUCCA G UACUCUCC	1988	GGAGAGTA GGCTAGCTACAACGA TGGAATCC	6785
8170	AUUCCAGU A CUCUCCUG	1989	CAGGAGAG GGCTAGCTACAACGA ACTGGAAT	6786
8180	UCUCCUGG G CAGCGGGU	1990	ACCCGCTG GGCTAGCTACAACGA CCAGGAGA	6787

8183	CCUGGGCA G CGGGUUGA	1991	TCAACCCG GGCTAGCTACAACGA TGCCCAGG	6788
8187	GGCAGCGG G UUGAGUUC	1992	GAACTCAA GGCTAGCTACAACGA CCGCTGCC	6789
8192	CGGGUUGA G UUCCUGGU	1993	ACCAGGAA GGCTAGCTACAACGA TCAACCCG	6790
8199	AGUUCCUG G UGAAUGCC	1994	GGCATTCA GGCTAGCTACAACGA CAGGAACT	6791
8203	CCUGGUGA A UGCCUGGA	1995	TCCAGGCA GGCTAGCTACAACGA TCACCAGG	6792
8205	UGGUGAAU G CCUGGAAA	1996	TTTCCAGG GGCTAGCTACAACGA ATTCACCA	6793
8213	GCCUGGAA A UCAAAGAA	1997	TTCTTTGA GGCTAGCTACAACGA TTCCAGGC	6794
8222	UCAAAGAA A UGCCCUAU	1998	ATAGGGCA GGCTAGCTACAACGA TTCTTTGA	6795
8224	AAAGAAAU G CCCUAUGG	1999	CCATAGGG GGCTAGCTACAACGA ATTTCTTT	6796
8229	AAUGCCCU A UGGGCUUU	2000	AAAGCCCA GGCTAGCTACAACGA AGGGCATT	6797
8233	CCCUAUGG G CUUUGCAU	2001	ATGCAAAG GGCTAGCTACAACGA CCATAGGG	6798
8238	UGGGCUUU G CAUAUGAC	2002	GTCATATG GGCTAGCTACAACGA AAAGCCCA	6799
8240	GGCUUUGC A UAUGACAC	2003	GTGTCATA GGCTAGCTACAACGA GCAAAGCC	6800
8242	CUUUGCAU A UGACACCC	2004	GGGTGTCA GGCTAGCTACAACGA ATGCAAAG	6801
8245	UGCAUAUG A CACCCGCU	2005	AGCGGGTG GGCTAGCTACAACGA CATATGCA	6802
8247	CAUAUGAC A CCCGCUGU	2006	ACAGCGGG GGCTAGCTACAACGA GTCATATG	6803
8251	UGACACCC G CUGUUUCG	2007	CGAAACAG GGCTAGCTACAACGA GGGTGTCA	6804
8254	CACCCGCU G UUUCGACU	2008	AGTCGAAA GGCTAGCTACAACGA AGCGGGTG	6805
8260	CUGUUUCG A CUCAACAG	2009	CTGTTGAG GGCTAGCTACAACGA CGAAACAG	6806
8265	UCGACUCA A CAGUCACC	2010	GGTGACTG GGCTAGCTACAACGA TGAGTCGA	6807
8268	ACUCAACA G UCACCGAG	2011	CTCGGTGA GGCTAGCTACAACGA TGTTGAGT	6808
8271	CAACAGUC A CCGAGAGU	2012	ACTCTCGG GGCTAGCTACAACGA GACTGTTG	6809
8278	CACCGAGA G UGACAUCC	2013	GGATGTCA GGCTAGCTACAACGA TCTCGGTG	6810
8281	CGAGAGUG A CAUCCGUG	2014	CACGGATG GGCTAGCTACAACGA CACTCTCG	6811
8283	AGAGUGAC A UCCGUGUC	2015	GACACGGA GGCTAGCTACAACGA GTCACTCT	6812
8287	UGACAUCC G UGUCGAGG	2016	CCTCGACA GGCTAGCTACAACGA GGATGTCA	6813
8289	ACAUCCGU G UCGAGGAG	2017	CTCCTCGA GGCTAGCTACAACGA ACGGATGT	6814
8297	GUCGAGGA G UCAAUUUA	2018	TAAATTGA GGCTAGCTACAACGA TCCTCGAC	6815
8301	AGGAGUCA A UUUACCAA	2019	TTGGTAAA GGCTAGCTACAACGA TGACTCCT	6816
8305	GUCAAUUU A CCAAUGUU	2020	AACATTGG GGCTAGCTACAACGA AAATTGAC	6817
8309	AUUUACCA A UGUUGUGA	2021	TCACAACA GGCTAGCTACAACGA TGGTAAAT	6818
8311	UUACCAAU G UUGUGACU	2022	AGTCACAA GGCTAGCTACAACGA ATTGGTAA	6819
8314	CCAAUGUU G UGACUUGG	2023	CCAAGTCA GGCTAGCTACAACGA AACATTGG	6820
8317	AUGUUGUG A CUUGGCCC	2024	GGGCCAAG GGCTAGCTACAACGA CACAACAT	6821
8322	GUGACUUG G CCCCCGAA	2025	TTCGGGGG GGCTAGCTACAACGA CAAGTCAC	6822
8331	CCCCCGAA G CCAGACAG	2026	CTGTCTGG GGCTAGCTACAACGA TTCGGGGG	6823
8336	GAAGCCAG A CAGGCCAU	2027	ATGGCCTG GGCTAGCTACAACGA CTGGCTTC	6824
8340	CCAGACAG G CCAUAAGG	2028	CCTTATGG GGCTAGCTACAACGA CTGTCTGG	6825
8343	GACAGGCC A UAAGGUCG	2029	CGACCTTA GGCTAGCTACAACGA GGCCTGTC	6826
8348	GCCAUAAG G UCGCUCAC	2030	GTGAGCGA GGCTAGCTACAACGA CTTATGGC	6827
8351	AUAAGGUC G CUCACAGA	2031	TCTGTGAG GGCTAGCTACAACGA GACCTTAT	6828
8355	GGUCGCUC A CAGAGCGG	2032	CCGCTCTG GGCTAGCTACAACGA GAGCGACC	6829
8360	CUCACAGA G CGGCUUUA	2033	TAAAGCCG GGCTAGCTACAACGA TCTGTGAG	6830
8363	ACAGAGCG G CUUUAUAU	2034	ATATAAAG GGCTAGCTACAACGA CGCTCTGT	6831
8368	GCGGCUUU A UAUCGGGG	2035	CCCCGATA GGCTAGCTACAACGA AAAGCCGC	6832
8370	GGCUUUAU A UCGGGGGU	2036	ACCCCCGA GGCTAGCTACAACGA ATAAAGCC	6833
8377	UAUCGGGG G UCCUCUGA	2037	TCAGAGGA GGCTAGCTACAACGA CCCCGATA	6834
8385	GUCCUCUG A CUAAUUCA	2038	TGAATTAG GGCTAGCTACAACGA CAGAGGAC	6835
8389	UCUGACUA A UUCAAAAG	2039	CTTTTGAA GGCTAGCTACAACGA TAGTCAGA	6836
8399	UCAAAAGG G CAGAACUG	2040	CAGTTCTG GGCTAGCTACAACGA CCTTTTGA	6837
8404	AGGGCAGA A CUGCGGUU	2041	AACCGCAG GGCTAGCTACAACGA TCTGCCCT	6838
8407	GCAGAACU G CGGUUAUC	2042	GATAACCG GGCTAGCTACAACGA AGTTCTGC	6839
8410	GAACUGCG G UUAUCGCC	2043	GGCGATAA GGCTAGCTACAACGA CGCAGTTC	6840
8413	CUGCGGUU A UCGCCGGU	2044	ACCGGCGA GGCTAGCTACAACGA AACCGCAG	6841
8416	CGGUUAUC G CCGGUGCC	2045	GGCACCGG GGCTAGCTACAACGA GATAACCG	6842
8420	UAUCGCCG G UGCCGCGC	2046	GCGCGGCA GGCTAGCTACAACGA CGGCGATA	6843
8422	UCGCCGGU G CCGCGCGA	2047	TCGCGCGG GGCTAGCTACAACGA ACCGGCGA	6844

8425	CCGGUGCC G CGCGAGCG	2048	CGCTCGCG GGCTAGCTACAACGA GGCACCGG	6845
8427	GGUGCCGC G CGAGCGGC	2049	GCCGCTCG GGCTAGCTACAACGA GCGGCACC	6846
8431	CCGCGCGA G CGGCGUGC	2050	GCACGCCG GGCTAGCTACAACGA TCGCGCGG	6847
8434	CGCGAGCG G CGUGCUGA	2051	TCAGCACG GGCTAGCTACAACGA CGCTCGCG	6848
8436	CGAGCGGC G UGCUGACG	2052	CGTCAGCA GGCTAGCTACAACGA GCCGCTCG	6849
8438	AGCGGCGU G CUGACGAC	2053	GTCGTCAG GGCTAGCTACAACGA ACGCCGCT	6850
8442	GCGUGCUG A CGACCAGC	2054	GCTGGTCG GGCTAGCTACAACGA CAGCACGC	6851
8445	UGCUGACG A CCAGCUGU	2055	ACAGCTGG GGCTAGCTACAACGA CGTCAGCA	6852
8449	GACGACCA G CUGUGGUA	2056	TACCACAG GGCTAGCTACAACGA TGGTCGTC	6853
8452	GACCAGCU G UGGUAAUA	2057	TATTACCA GGCTAGCTACAACGA AGCTGGTC	6854
8455	CAGCUGUG G UAAUACCC	2058	GGGTATTA GGCTAGCTACAACGA CACAGCTG	6855
8458	CUGUGGUA A UACCCUCA	2059	TGAGGGTA GGCTAGCTACAACGA TACCACAG	6856
8460	GUGGUAAU A CCCUCACA	2060	TGTGAGGG GGCTAGCTACAACGA ATTACCAC	6857
8466	AUACCCUC A CAUGUUAC	2061	GTAACATG GGCTAGCTACAACGA GAGGGTAT	6858
8468	ACCCUCAC A UGUUACUU	2062	AAGTAACA GGCTAGCTACAACGA GTGAGGGT	6859
8470	CCUCACAU G UUACUUGA	2063	TCAAGTAA GGCTAGCTACAACGA ATGTGAGG	6860
8473	CACAUGUU A CUUGAAAG	2064	CTTTCAAG GGCTAGCTACAACGA AACATGTG	6861
8481	ACUUGAAA G CCUCUGCG	2065	CGCAGAGG GGCTAGCTACAACGA TTTCAAGT	6862
8487	AAGCCUCU G CGGCCUGU	2066	ACAGGCCG GGCTAGCTACAACGA AGAGGCTT	6863
8490	CCUCUGCG G CCUGUCGA	2067	TCGACAGG GGCTAGCTACAACGA CGCAGAGG	6864
8494	UGCGGCCU G UCGAGCUG	2068	CAGCTCGA GGCTAGCTACAACGA AGGCCGCA	6865
8499	CCUGUCGA G CUGCGAAG	2069	CTTCGCAG GGCTAGCTACAACGA TCGACAGG	6866
8502	GUCGAGCU G CGAAGCUC	2070	GAGCTTCG GGCTAGCTACAACGA AGCTCGAC	6867
8507	GCUGCGAA G CUCCAGGA	2071	TCCTGGAG GGCTAGCTACAACGA TTCGCAGC	6868
8515	GCUCCAGG A CUGCACGA	2072	TCGTGCAG GGCTAGCTACAACGA CCTGGAGC	6869
8518	CCAGGACU G CACGAUGC	2073	GCATCGTG GGCTAGCTACAACGA AGTCCTGG	6870
8520	AGGACUGC A CGAUGCUC	2074	GAGCATCG GGCTAGCTACAACGA GCAGTCCT	6871
8523	ACUGCACG A UGCUCGUG	2075	CACGAGCA GGCTAGCTACAACGA CGTGCAGT	6872
8525	UGCACGAU G CUCGUGUG	2076	CACACGAG GGCTAGCTACAACGA ATCGTGCA	6873
8529	CGAUGCUC G UGUGUGGA	2077	TCCACACA GGCTAGCTACAACGA GAGCATCG	6874
8531	AUGCUCGU G UGUGGAGA	2078	TCTCCACA GGCTAGCTACAACGA ACGAGCAT	6875
8533	GCUCGUGU G UGGAGACG	2079	CGTCTCCA GGCTAGCTACAACGA ACACGAGC	6876
8539	GUGUGGAG A CGACCUGG	2080	CCAGGTCG GGCTAGCTACAACGA CTCCACAC	6877
8542	UGGAGACG A CCUGGUCG	2081	CGACCAGG GGCTAGCTACAACGA CGTCTCCA	6878
8547	ACGACCUG G UCGUUAUC	2082	GATAACGA GGCTAGCTACAACGA CAGGTCGT	6879
8550	ACCUGGUC G UUAUCUGU	2083	ACAGATAA GGCTAGCTACAACGA GACCAGGT	6880
8553	UGGUCGUU A UCUGUGAA	2084	TTCACAGA GGCTAGCTACAACGA AACGACCA	6881
8557	CGUUAUCU G UGAAAGUG	2085	CACTTTCA GGCTAGCTACAACGA AGATAACG	6882
8563	CUGUGAAA G UGCGGGGA	2086	TCCCCGCA GGCTAGCTACAACGA TTTCACAG	6883
8565	GUGAAAGU G CGGGGACC	2087	GGTCCCCG GGCTAGCTACAACGA ACTTTCAC	6884
8571	GUGCGGGG A CCCAAGAG	2088	CTCTTGGG GGCTAGCTACAACGA CCCCGCAC	6885
8581	CCAAGAGG A CGCGGCGA	2089	TCGCCGCG GGCTAGCTACAACGA CCTCTTGG	6886
8583	AAGAGGAC G CGGCGAGC	2090	GCTCGCCG GGCTAGCTACAACGA GTCCTCTT	6887
8586	AGGACGCG G CGAGCCUA	2091	TAGGCTCG GGCTAGCTACAACGA CGCGTCCT	6888
8590	CGCGGCGA G CCUACGAG	2092	CTCGTAGG GGCTAGCTACAACGA TCGCCGCG	6889
8594	GCGAGCCU A CGAGUCUU	2093	AAGACTCG GGCTAGCTACAACGA AGGCTCGC	6890
8598	GCCUACGA G UCUUCACG	2094	CGTGAAGA GGCTAGCTACAACGA TCGTAGGC	6891
8604	GAGUCUUC A CGGAGGCU	2095	AGCCTCCG GGCTAGCTACAACGA GAAGACTC	6892
8610	UCACGGAG G CUAUGACU	2096	AGTCATAG GGCTAGCTACAACGA CTCCGTGA	6893
8613	CGGAGGCU A UGACUAGG	2097	CCTAGTCA GGCTAGCTACAACGA AGCCTCCG	6894
8616	AGGCUAUG A CUAGGUAC	2098	GTACCTAG GGCTAGCTACAACGA CATAGCCT	6895
8621	AUGACUAG G UACUCUGC	2099	GCAGAGTA GGCTAGCTACAACGA CTAGTCAT	6896
8623	GACUAGGU A CUCUGCCC	2100	GGGCAGAG GGCTAGCTACAACGA ACCTAGTC	6897
8628	GGUACUCU G CCCCCCCC	2101	GGGGGGGG GGCTAGCTACAACGA AGAGTACC	6898
8641	CCCCGGGG A CCCGCCCC	2102	GGGGCGGG GGCTAGCTACAACGA CCCCGGGG	6899
8645	GGGGACCC G CCCCAACC	2103	GGTTGGGG GGCTAGCTACAACGA GGGTCCCC	6900
8651	CCGCCCCA A CCGGAAUA	2104	TATTCCGG GGCTAGCTACAACGA TGGGGCGG	6901

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8659	ACCGGAAU A CGACUUGG	2106	CCAAGTCG GGCTAGCTACAACGA ATTCCGGT	6903
8662	GGAAUACG A CUUGGAGU	2107	ACTCCAAG GGCTAGCTACAACGA CGTATTCC	6904
8669	GACUUGGA G UUGAUAAC	2108	GTTATCAA GGCTAGCTACAACGA TCCAAGTC	6905
8673	UGGAGUUG A UAACAUCA	2109	TGATGTTA GGCTAGCTACAACGA CAACTCCA	6906
8676	AGUUGAUA A CAUCAUGC	2110	GCATGATG GGCTAGCTACAACGA TATCAACT	6907
8678	UUGAUAAC A UCAUGCUC	2111	GAGCATGA GGCTAGCTACAACGA GTTATCAA	6908
8681	AUAACAUC A UGCUCCUC	2112	GAGGAGCA GGCTAGCTACAACGA GATGTTAT	6909
8683	AACAUCAU G CUCCUCCA	2113	TGGAGGAG GGCTAGCTACAACGA ATGATGTT	6910
8692	CUCCUCCA A CGUAUCAG	2114	CTGATACG GGCTAGCTACAACGA TGGAGGAG	6911
8694	CCUCCAAC G UAUCAGUU	2115	AACTGATA GGCTAGCTACAACGA GTTGGAGG	6912
8696	UCCAACGU A UCAGUUGC	2116	GCAACTGA GGCTAGCTACAACGA ACGTTGGA	6913
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8703	UAUCAGUU G CACACGAU	2118	ATCGTGTG GGCTAGCTACAACGA AACTGATA	6915
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8707	AGUUGCAC A CGAUGCAU	2120	ATGCATCG GGCTAGCTACAACGA GTGCAACT	6917
8710	UGCACACG A UGCAUCUG	2121	CAGATGCA GGCTAGCTACAACGA CGTGTGCA	6918
8712	CACACGAU G CAUCUGGC	2122	GCCAGATG GGCTAGCTACAACGA ATCGTGTG	6919
8714	CACGAUGC A UCUGGCAA	2123	TTGCCAGA GGCTAGCTACAACGA GCATCGTG	6920
8719	UGCAUCUG G CAAAAGGG	2124	CCCTTTTG GGCTAGCTACAACGA CAGATGCA	6921
8727	GCAAAAGG G UGUACUAC	2125	GTAGTACA GGCTAGCTACAACGA CCTTTTGC	6922
8729	AAAAGGGU G UACUACCU	2126	AGGTAGTA GGCTAGCTACAACGA ACCCTTTT	6923
8731	AAGGGUGU A CUACCUCA	2127	TGAGGTAG GGCTAGCTACAACGA ACACCCTT	6924
8734	GGUGUACU A CCUCACCC	2128	GGGTGAGG GGCTAGCTACAACGA AGTACACC	6925
8739	ACUACCUC A CCCGUGAC	2129	GTCACGGG GGCTAGCTACAACGA GAGGTAGT	6926
8743	CCUCACCC G UGACCCCA	2130	TGGGGTCA GGCTAGCTACAACGA GGGTGAGG	6927
8746	CACCCGUG A CCCCACCA	2131	TGGTGGGG GGCTAGCTACAACGA CACGGGTG	6928
8751	GUGACCCC A CCACCCCC	2132	GGGGGTGG GGCTAGCTACAACGA GGGGTCAC	6929
8754	ACCCCACC A CCCCCCUU	2133	AAGGGGGG GGCTAGCTACAACGA GGTGGGGT	6930
8763	CCCCCCUU G CGCGGGCU	2134	AGCCCGCG GGCTAGCTACAACGA AAGGGGGG	6931
8765	CCCCUUGC G CGGGCUGC	2135	GCAGCCCG GGCTAGCTACAACGA GCAAGGGG	6932
8769	UUGCGCGG G CUGCGUGG	2136	CCACGCAG GGCTAGCTACAACGA CCGCGCAA	6933
8772	CGCGGGCU G CGUGGGAG	2137	CTCCCACG GGCTAGCTACAACGA AGCCCGCG	6934
8774	CGGGCUGC G UGGGAGAC	2138	GTCTCCCA GGCTAGCTACAACGA GCAGCCCG	6935
8781	CGUGGGAG A CAGCUAGA	2139	TCTAGCTG GGCTAGCTACAACGA CTCCCACG	6936
8784	GGGAGACA G CUAGAAGC	2140	GCTTCTAG GGCTAGCTACAACGA TGTCTCCC	6937
8791	AGCUAGAA G CACUCCAG	2141	CTGGAGTG GGCTAGCTACAACGA TTCTAGCT	6938
8793	CUAGAAGC A CUCCAGUC	2142	GACTGGAG GGCTAGCTACAACGA GCTTCTAG	6939
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8815	CUGGCUAG G CAACAUCA	2146	TGATGTTG GGCTAGCTACAACGA CTAGCCAG	6943
8818	GCUAGGCA A CAUCAUCA	2147	TGATGATG GGCTAGCTACAACGA TGCCTAGC	6944
8820	UAGGCAAC A UCAUCAUG	2148	CATGATGA GGCTAGCTACAACGA GTTGCCTA	6945
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8832	UCAUGUUU G CACCCACU	2152	AGTGGGTG GGCTAGCTACAACGA AAACATGA	6949
8834	AUGUUUGC A CCCACUCU	2153	AGAGTGGG GGCTAGCTACAACGA GCAAACAT	6950
8838	UUGCACCC A CUCUAUGG	2154	CCATAGAG GGCTAGCTACAACGA GGGTGCAA	6951
8843	CCCACUCU A UGGGUAAG	2155	CTTACCCA GGCTAGCTACAACGA AGAGTGGG	6952
8847	CUCUAUGG G UAAGGAUG	2156	CATCCTTA GGCTAGCTACAACGA CCATAGAG	6953
8853	GGGUAAGG A UGAUUCUG	2157	CAGAATCA GGCTAGCTACAACGA CCTTACCC	6954
8856	UAAGGAUG A UUCUGAUG	2158	CATCAGAA GGCTAGCTACAACGA CATCCTTA	6955
8862	UGAUUCUG A UGACUCAC	2159	GTGAGTCA GGCTAGCTACAACGA CAGAATCA	6956
8865	UUCUGAUG A CUCACUUC	2160	GAAGTGAG GGCTAGCTACAACGA CATCAGAA	6957
8869	GAUGACUC A CUUCUUCU	2161	AGAAGAAG GGCTAGCTACAACGA GAGTCATC	6958

8880	UCUUCUCC A UCCUUCUA	2162	TAGAAGGA GGCTAGCTACAACGA GGAGAAGA	6959
8889	UCCUUCUA G CCCAGGAG	2163	CTCCTGGG GGCTAGCTACAACGA TAGAAGGA	6960
8897	GCCCAGGA G CAACUUGA	2164	TCAAGTTG GGCTAGCTACAACGA TCCTGGGC	6961
8900	CAGGAGCA A CUUGAGAA	2165	TTCTCAAG GGCTAGCTACAACGA TGCTCCTG	6962
8910	UUGAGAAA G CCCUAGAC	2166	GTCTAGGG GGCTAGCTACAACGA TTTCTCAA	6963
8917	AGCCCUAG A CUGCCAGA	2167	TCTGGCAG GGCTAGCTACAACGA CTAGGGCT	6964
8920	CCUAGACU G CCAGAUCU	2168	AGATCTGG GGCTAGCTACAACGA AGTCTAGG	6965
8925	ACUGCCAG A UCUACGGG	2169	CCCGTAGA GGCTAGCTACAACGA CTGGCAGT	6966
8929	CCAGAUCU A CGGGGCUU	2170	AAGCCCCG GGCTAGCTACAACGA AGATCTGG	6967
8934	UCUACGGG G CUUGUUAC	2171	GTAACAAG GGCTAGCTACAACGA CCCGTAGA	6968
8938	CGGGGCUU G UUACUCCA	2172	TGGAGTAA GGCTAGCTACAACGA AAGCCCCG	6969
8941	GGCUUGUU A CUCCAUUG	2173	CAATGGAG GGCTAGCTACAACGA AACAAGCC	6970
8946	GUUACUCC A UUGAGCCA	2174	TGGCTCAA GGCTAGCTACAACGA GGAGTAAC	6971
8951	UCCAUUGA G CCACUUGA	2175	TCAAGTGG GGCTAGCTACAACGA TCAATGGA	6972
8954	AUUGAGCC A CUUGACCU	2176	AGGTCAAG GGCTAGCTACAACGA GGCTCAAT	6973
8959	GCCACUUG A CCUACCUC	2177	GAGGTAGG GGCTAGCTACAACGA CAAGTGGC	6974
8963	CUUGACCU A CCUCAGAU	2178	ATCTGAGG GGCTAGCTACAACGA AGGTCAAG	6975
8970	UACCUCAG A UCAUUCAG	2179	CTGAATGA GGCTAGCTACAACGA CTGAGGTA	6976
8973	CUCAGAUC A UUCAGCGA	2180	TCGCTGAA GGCTAGCTACAACGA GATCTGAG	6977
8978	AUCAUUCA G CGACUCCA	2181	TGGAGTCG GGCTAGCTACAACGA TGAATGAT	6978
8981	AUUCAGCG A CUCCAUGG	2182	CCATGGAG GGCTAGCTACAACGA CGCTGAAT	6979
8986	GCGACUCC A UGGUCUUA	2183	TAAGACCA GGCTAGCTACAACGA GGAGTCGC	6980
8989	ACUCCAUG G UCUUAGCG	2184	CGCTAAGA GGCTAGCTACAACGA CATGGAGT	6981
8995	UGGUCUUA G CGCAUUUU	2185	AAAATGCG GGCTAGCTACAACGA TAAGACCA	6982
8997	GUCUUAGC G CAUUUUCA	2186	TGAAAATG GGCTAGCTACAACGA GCTAAGAC	6983
8999	CUUAGCGC A UUUUCACU	2187	AGTGAAAA GGCTAGCTACAACGA GCGCTAAG	6984
9005	GCAUUUUC A CUCCAUAG	2188	CTATGGAG GGCTAGCTACAACGA GAAAATGC	6985
9010	UUCACUCC A UAGUUACU	2189	AGTAACTA GGCTAGCTACAACGA GGAGTGAA	6986
9013	ACUCCAUA G UUACUCCC	2190	GGGAGTAA GGCTAGCTACAACGA TATGGAGT	6987
9016	CCAUAGUU A CUCCCCAG	2191	CTGGGGAG GGCTAGCTACAACGA AACTATGG	6988
9025	CUCCCCAG G UGAAAUCA	2192	TGATTTCA GGCTAGCTACAACGA CTGGGGAG	6989
9030	CAGGUGAA A UCAAUAGG	2193	CCTATTGA GGCTAGCTACAACGA TTCACCTG	6990
9034	UGAAAUCA A UAGGGUGG	2194	CCACCCTA GGCTAGCTACAACGA TGATTTCA	6991
9039	UCAAUAGG G UGGCAUCA	2195	TGATGCCA GGCTAGCTACAACGA CCTATTGA	6992
9042	AUAGGGUG G CAUCAUGC	2196	GCATGATG GGCTAGCTACAACGA CACCCTAT	6993
9044	AGGGUGGC A UCAUGCCU	2197	AGGCATGA GGCTAGCTACAACGA GCCACCCT	6994
9047	GUGGCAUC A UGCCUCAG	2198	CTGAGGCA GGCTAGCTACAACGA GATGCCAC	6995
9049	GGCAUCAU G CCUCAGGA	2199	TCCTGAGG GGCTAGCTACAACGA ATGATGCC	6996
9059	CUCAGGAA A CUUGGGGU	2200	ACCCCAAG GGCTAGCTACAACGA TTCCTGAG	6997
9066	AACUUGGG G UACCACCC	2201	GGGTGGTA GGCTAGCTACAACGA CCCAAGTT	6998
9068	CUUGGGGU A CCACCCUU	2202	AAGGGTGG GGCTAGCTACAACGA ACCCCAAG	6999
9071	GGGGUACC A CCCUUGCG	2203	CGCAAGGG GGCTAGCTACAACGA GGTACCCC	7000
9077	CCACCCUU G CGAACCUG	2204	CAGGTTCG GGCTAGCTACAACGA AAGGGTGG	7001
9081	CCUUGCGA A CCUGGAGA	2205	TCTCCAGG GGCTAGCTACAACGA TCGCAAGG	7002
9089	ACCUGGAG A CAUCGGGC	2206	GCCCGATG GGCTAGCTACAACGA CTCCAGGT	7003
9091	CUGGAGAC A UCGGGCCA	2207	TGGCCCGA GGCTAGCTACAACGA GTCTCCAG	7004
9096	GACAUCGG G CCAGAAGU	2208	ACTTCTGG GGCTAGCTACAACGA CCGATGTC	7005
9103	GGCCAGAA G UGUUCGCG	2209	CGCGAACA GGCTAGCTACAACGA TTCTGGCC	7006
9105	CCAGAAGU G UUCGCGCU	2210	AGCGCGAA GGCTAGCTACAACGA ACTTCTGG	7007
9109	AAGUGUUC G CGCUAAGC	2211	GCTTAGCG GGCTAGCTACAACGA GAACACTT	7008
9111	GUGUUCGC G CUAAGCUA	2212	TAGCTTAG GGCTAGCTACAACGA GCGAACAC	7009
9116	CGCGCUAA G CUACUGUC	2213	GACAGTAG GGCTAGCTACAACGA TTAGCGCG	7010
9119	GCUAAGCU A CUGUCCCA	2214	TGGGACAG GGCTAGCTACAACGA AGCTTAGC	7011
9122	AAGCUACU G UCCCAGGG	2215	CCCTGGGA GGCTAGCTACAACGA AGTAGCTT	7012
9138	GGGGGAGG G CCGCCACC	2216	GGTGGCGG GGCTAGCTACAACGA CCTCCCCC	7013
9141	GGAGGGCC G CCACCUGU	2217	ACAGGTGG GGCTAGCTACAACGA GGCCCTCC	7014
9144	GGGCCGCC A CCUGUGGC	2218	GCCACAGG GGCTAGCTACAACGA GGCGGCCC	7015

9148	CGCCACCU G UGGCAGGU	2219	ACCTGCCA GGCTAGCTACAACGA AGGTGGCG	7016
9151	CACCUGUG G CAGGUACC	2220	GGTACCTG GGCTAGCTACAACGA CACAGGTG	7017
9155	UGUGGCAG G UACCUCUU	2221	AAGAGGTA GGCTAGCTACAACGA CTGCCACA	7018
9157	UGGCAGGU A CCUCUUCA	2222	TGAAGAGG GGCTAGCTACAACGA ACCTGCCA	7019
9166	CCUCUUCA A CUGGGCAG	2223	CTGCCCAG GGCTAGCTACAACGA TGAAGAGG	7020
9171	UCAACUGG G CAGUAAAG	2224	CTTTACTG GGCTAGCTACAACGA CCAGTTGA	7021
9174	ACUGGGCA G UAAAGACC	2225	GGTCTTTA GGCTAGCTACAACGA TGCCCAGT	7022
9180	CAGUAAAG A CCAAACUC	2226	GAGTTTGG GGCTAGCTACAACGA CTTTACTG	7023
9185	AAGACCAA A CUCAAACU	2227	AGTTTGAG GGCTAGCTACAACGA TTGGTCTT	7024
9191	AAACUCAA A CUCACUCC	2228	GGAGTGAG GGCTAGCTACAACGA TTGAGTTT	7025
9195	UCAAACUC A CUCCAAUC	2229	GATTGGAG GGCTAGCTACAACGA GAGTTTGA	7026
9201	UCACUCCA A UCCCAGCU	2230	AGCTGGGA GGCTAGCTACAACGA TGGAGTGA	7027
9207	CAAUCCCA G CUGCGUCU	2231	AGACGCAG GGCTAGCTACAACGA TGGGATTG	7028
9210	UCCCAGCU G CGUCUCAG	2232	CTGAGACG GGCTAGCTACAACGA AGCTGGGA	7029
9212	CCAGCUGC G UCUCAGUU	2233	AACTGAGA GGCTAGCTACAACGA GCAGCTGG	7030
9218	GCGUCUCA G UUGGACUU	2234	AAGTCCAA GGCTAGCTACAACGA TGAGACGC	7031
9223	UCAGUUGG A CUUGUCCA	2235	TGGACAAG GGCTAGCTACAACGA CCAACTGA	7032
9227	UUGGACUU G UCCAACUG	2236	CAGTTGGA GGCTAGCTACAACGA AAGTCCAA	7033
9232	CUUGUCCA A CUGGUUCG	2237	CGAACCAG GGCTAGCTACAACGA TGGACAAG	7034
9236	UCCAACUG G UUCGUUGC	2238	GCAACGAA GGCTAGCTACAACGA CAGTTGGA	7035
9240	ACUGGUUC G UUGCUGGC	2239	GCCAGCAA GGCTAGCTACAACGA GAACCAGT	7036
9243	GGUUCGUU G CUGGCUAC	2240	GTAGCCAG GGCTAGCTACAACGA AACGAACC	7037
9247	CGUUGCUG G CUACAGCG	2241	CGCTGTAG GGCTAGCTACAACGA CAGCAACG	7038
9250	UGCUGGCU A CAGCGGGG	2242	CCCCGCTG GGCTAGCTACAACGA AGCCAGCA	7039
9253	UGGCUACA G CGGGGGAG	2243	CTCCCCCG GGCTAGCTACAACGA TGTAGCCA	7040
9262	CGGGGGAG A CGUGUAUC	2244	GATACACG GGCTAGCTACAACGA CTCCCCCG	7041
9264	GGGGAGAC G UGUAUCAC	2245	GTGATACA GGCTAGCTACAACGA GTCTCCCC	7042
9266	GGAGACGU G UAUCACAG	2246	CTGTGATA GGCTAGCTACAACGA ACGTCTCC	7043
9268	AGACGUGU A UCACAGCC	2247	GGCTGTGA GGCTAGCTACAACGA ACACGTCT	7044
9271	CGUGUAUC A CAGCCUGU	2248	ACAGGCTG GGCTAGCTACAACGA GATACACG	7045
9274	GUAUCACA G CCUGUCUC	2249	GAGACAGG GGCTAGCTACAACGA TGTGATAC	7046
9278	CACAGCCU G UCUCGUGC	2250	GCACGAGA GGCTAGCTACAACGA AGGCTGTG	7047
9283	CCUGUCUC G UGCCCGAC	2251	GTCGGGCA GGCTAGCTACAACGA GAGACAGG	7048
9285	UGUCUCGU G CCCGACCC	2252	GGGTCGGG GGCTAGCTACAACGA ACGAGACA	7049
9290	CGUGCCCG A CCCCGCUG	2253	CAGCGGGG GGCTAGCTACAACGA CGGGCACG	7050
9295	CCGACCCC G CUGGUUCA	2254	TGAACCAG GGCTAGCTACAACGA GGGGTCGG	7051
9299	CCCCGCUG G UUCAUGCU	2255	AGCATGAA GGCTAGCTACAACGA CAGCGGGG	7052
9303	GCUGGUUC A UGCUUUGC	2256	GCAAAGCA GGCTAGCTACAACGA GAACCAGC	7053
9305	UGGUUCAU G CUUUGCCU	2257	AGGCAAAG GGCTAGCTACAACGA ATGAACCA	7054
9310	CAUGCUUU G CCUACUCC	2258	GGAGTAGG GGCTAGCTACAACGA AAAGCATG	7055
9314	CUUUGCCU A CUCCUACU	2259	AGTAGGAG GGCTAGCTACAACGA AGGCAAAG	7056
9320	CUACUCCU A CUCUCCGU	2260	ACGGAGAG GGCTAGCTACAACGA AGGAGTAG	7057
9327	UACUCUCC G UAGGGGUA	2261	TACCCCTA GGCTAGCTACAACGA GGAGAGTA	7058
9333	CCGUAGGG G UAGGCAUC	2262	GATGCCTA GGCTAGCTACAACGA CCCTACGG	7059
9337	AGGGGUAG G CAUCUACC	2263	GGTAGATG GGCTAGCTACAACGA CTACCCCT	7060
9339	GGGUAGGC A UCUACCUG	2264	CAGGTAGA GGCTAGCTACAACGA GCCTACCC	7061
9343	AGGCAUCU A CCUGCUCC	2265	GGAGCAGG GGCTAGCTACAACGA AGATGCCT	7062
9347	AUCUACCU G CUCCCCAA	2266	TTGGGGAG GGCTAGCTACAACGA AGGTAGAT	7063
9355	GCUCCCCA A CCGAUGAA	2267	TTCATCGG GGCTAGCTACAACGA TGGGGAGC	7064
9359	CCCAACCG A UGAACAGG	2268	CCTGTTCA GGCTAGCTACAACGA CGGTTGGG	7065
9363	ACCGAUGA A CAGGGAGC	2269	GCTCCCTG GGCTAGCTACAACGA TCATCGGT	7066
9370	AACAGGGA G CUAAACAC	2270	GTGTTTAG GGCTAGCTACAACGA TCCCTGTT	7067
9375	GGAGCUAA A CACUCCAG	2271	CTGGAGTG GGCTAGCTACAACGA TTAGCTCC	7068
9377	AGCUAAAC A CUCCAGGC	2272	GCCTGGAG GGCTAGCTACAACGA GTTTAGCT	7069
9384	CACUCCAG G CCAAUAGG	2273	CCTATTGG GGCTAGCTACAACGA CTGGAGTG	7070
9388	CCAGGCCA A UAGGCCAU	2274	ATGGCCTA GGCTAGCTACAACGA TGGCCTGG	7071
9392	GCCAAUAG G CCAUCCCG	2275	CGGGATGG GGCTAGCTACAACGA CTATTGGC	7072

9395	AAUAGGCC A UCCCGUUU	2276	AAACGGGA GGCTAGCTACAACGA GGCCTATT	7073
9400	GCCAUCCC G UUUUUUUU	2277	AAAAAAAA GGCTAGCTACAACGA GGGATGGC	7074

Input Sequence = HPCK1S1. Cut Site = R/Y
Arm Length = 8. Core Sequence = GGCTAGCTACAACGA
HPCK1S1 Hepatitis C virus (strain HCV-1b, clone HCV-K1-S1), complete genome; acc# gi|1030702|dbj|D50483.1; 9410 nt

Table IV: HCV minus strand DNAzyme and Substrate Sequence

Pos	Substrate	SeqID	DNAzyme	SeqID
9413	AAAAAAAA A CGGGAUGG	2278	CCATCCCG GGCTAGCTACAACGA TTTTTTTT	7075
9408	AAAACGGG A UGGCCUAU	2279	ATAGGCCA GGCTAGCTACAACGA CCCGTTTT	7076
9405	ACGGGAUG G CCUAUUGG	2280	CCAATAGG GGCTAGCTACAACGA CATCCCGT	7077
9401	GAUGGCCU A UUGGCCUG	2281	CAGGCCAA GGCTAGCTACAACGA AGGCCATC	7078
9397	GCCUAUUG G CCUGGAGU	2282	ACTCCAGG GGCTAGCTACAACGA CAATAGGC	7079
9390	GGCCUGGA G UGUUUAGC	2283	GCTAAACA GGCTAGCTACAACGA TCCAGGCC	7080
9388	CCUGGAGU G UUUAGCUC	2284	GAGCTAAA GGCTAGCTACAACGA ACTCCAGG	7081
9383	AGUGUUUA G CUCCCUGU	2285	ACAGGGAG GGCTAGCTACAACGA TAAACACT	7082
9376	AGCUCCCU G UUCAUCGG	2286	CCGATGAA GGCTAGCTACAACGA AGGGAGCT	7083
9372	CCCUGUUC A UCGGUUGG	2287	CCAACCGA GGCTAGCTACAACGA GAACAGGG	7084
9368	GUUCAUCG G UUGGGGAG	2288	CTCCCCAA GGCTAGCTACAACGA CGATGAAC	7085
9360	GUUGGGGA G CAGGUAGA	2289	TCTACCTG GGCTAGCTACAACGA TCCCCAAC	7086
9356	GGGAGCAG G UAGAUGCC	2290	GGCATCTA GGCTAGCTACAACGA CTGCTCCC	7087
9352	GCAGGUAG A UGCCUACC	2291	GGTAGGCA GGCTAGCTACAACGA CTACCTGC	7088
9350	AGGUAGAU G CCUACCCC	2292	GGGGTAGG GGCTAGCTACAACGA ATCTACCT	7089
9346	AGAUGCCU A CCCCUACG	2293	CGTAGGGG GGCTAGCTACAACGA AGGCATCT	7090
9340	CUACCCCU A CGGAGAGU	2294	ACTCTCCG GGCTAGCTACAACGA AGGGGTAG	7091
9333	UACGGAGA G UAGGAGUA	2295	TACTCCTA GGCTAGCTACAACGA TCTCCGTA	7092
9327	GAGUAGGA G UAGGCAAA	2296	TTTGCCTA GGCTAGCTACAACGA TCCTACTC	7093
9323	AGGAGUAG G CAAAGCAU	2297	ATGCTTTG GGCTAGCTACAACGA CTACTCCT	7094
9318	UAGGCAAA G CAUGAACC	2298	GGTTCATG GGCTAGCTACAACGA TTTGCCTA	7095
9316	GGCAAAGC A UGAACCAG	2299	CTGGTTCA GGCTAGCTACAACGA GCTTTGCC	7096
9312	AAGCAUGA A CCAGCGGG	2300	CCCGCTGG GGCTAGCTACAACGA TCATGCTT	7097
9308	AUGAACCA G CGGGGUCG	2301	CGACCCCG GGCTAGCTACAACGA TGGTTCAT	7098
9303	CCAGCGGG G UCGGGCAC	2302	GTGCCCGA GGCTAGCTACAACGA CCCGCTGG	7099
9298	GGGGUCGG G CACGAGAC	2303	GTCTCGTG GGCTAGCTACAACGA CCGACCCC	7100
9296	GGUCGGGC A CGAGACAG	2304	CTGTCTCG GGCTAGCTACAACGA GCCCGACC	7101
9291	GGCACGAG A CAGGCUGU	2305	ACAGCCTG GGCTAGCTACAACGA CTCGTGCC	7102
9287	CGAGACAG G CUGUGAUA	2306	TATCACAG GGCTAGCTACAACGA CTGTCTCG	7103
9284	GACAGGCU G UGAUACAC	2307	GTGTATCA GGCTAGCTACAACGA AGCCTGTC	7104
9281	AGGCUGUG A UACACGUC	2308	GACGTGTA GGCTAGCTACAACGA CACAGCCT	7105
9279	GCUGUGAU A CACGUCUC	2309	GAGACGTG GGCTAGCTACAACGA ATCACAGC	7106
9277	UGUGAUAC A CGUCUCCC	2310	GGGAGACG GGCTAGCTACAACGA GTATCACA	7107
9275	UGAUACAC G UCUCCCCC	2311	GGGGGAGA GGCTAGCTACAACGA GTGTATCA	7108
9266	UCUCCCCC G CUGUAGCC	2312	GGCTACAG GGCTAGCTACAACGA GGGGGAGA	7109
9263	CCCCCGCU G UAGCCAGC	2313	GCTGGCTA GGCTAGCTACAACGA AGCGGGGG	7110
9260	CCGCUGUA G CCAGCAAC	2314	GTTGCTGG GGCTAGCTACAACGA TACAGCGG	7111
9256	UGUAGCCA G CAACGAAC	2315	GTTCGTTG GGCTAGCTACAACGA TGGCTACA	7112
9253	AGCCAGCA A CGAACCAG	2316	CTGGTTCG GGCTAGCTACAACGA TGCTGGCT	7113
9249	AGCAACGA A CCAGUUGG	2317	CCAACTGG GGCTAGCTACAACGA TCGTTGCT	7114
9245	ACGAACCA G UUGGACAA	2318	TTGTCCAA GGCTAGCTACAACGA TGGTTCGT	7115
9240	CCAGUUGG A CAAGUCCA	2319	TGGACTTG GGCTAGCTACAACGA CCAACTGG	7116
9236	UUGGACAA G UCCAACUG	2320	CAGTTGGA GGCTAGCTACAACGA TTGTCCAA	7117
9231	CAAGUCCA A CUGAGACG	2321	CGTCTCAG GGCTAGCTACAACGA TGGACTTG	7118
9225	CAACUGAG A CGCAGCUG	2322	CAGCTGCG GGCTAGCTACAACGA CTCAGTTG	7119
9223	ACUGAGAC G CAGCUGGG	2323	CCCAGCTG GGCTAGCTACAACGA GTCTCAGT	7120
9220	GAGACGCA G CUGGGAUU	2324	AATCCCAG GGCTAGCTACAACGA TGCGTCTC	7121
9214	CAGCUGGG A UUGGAGUG	2325	CACTCCAA GGCTAGCTACAACGA CCCAGCTG	7122
9208	GGAUUGGA G UGAGUUUG	2326	CAAACTCA GGCTAGCTACAACGA TCCAATCC	7123
9204	UGGAGUGA G UUUGAGUU	2327	AACTCAAA GGCTAGCTACAACGA TCACTCCA	7124
9198	GAGUUUGA G UUUGGUCU	2328	AGACCAAA GGCTAGCTACAACGA TCAAACTC	7125
9193	UGAGUUUG G UCUUUACU	2329	AGTAAAGA GGCTAGCTACAACGA CAAACTCA	7126

9187	UGGUCUUU A CUGCCCAG	2330	CTGGGCAG GGCTAGCTACAACGA AAAGACCA	7127
9184	UCUUUACU G CCCAGUUG	2331	CAACTGGG GGCTAGCTACAACGA AGTAAAGA	7128
9179	ACUGCCCA G UUGAAGAG	2332	CTCTTCAA GGCTAGCTACAACGA TGGGCAGT	7129
9170	UUGAAGAG G UACCUGCC	2333	GGCAGGTA GGCTAGCTACAACGA CTCTTCAA	7130
9168	GAAGAGGU A CCUGCCAC	2334	GTGGCAGG GGCTAGCTACAACGA ACCTCTTC	7131
9164	AGGUACCU G CCACAGGU	2335	ACCTGTGG GGCTAGCTACAACGA AGGTACCT	7132
9161	UACCUGCC A CAGGUGGC	2336	GCCACCTG GGCTAGCTACAACGA GGCAGGTA	7133
9157	UGCCACAG G UGGCGGCC	2337	GGCCGCCA GGCTAGCTACAACGA CTGTGGCA	7134
9154	CACAGGUG G CGGCCCUC	2338	GAGGGCCG GGCTAGCTACAACGA CACCTGTG	7135
9151	AGGUGGCG G CCCUCCCC	2339	GGGGAGGG GGCTAGCTACAACGA CGCCACCT	7136
9135	CCCCUGGG A CAGUAGCU	2340	AGCTACTG GGCTAGCTACAACGA CCCAGGGG	7137
9132	CUGGGACA G UAGCUUAG	2341	CTAAGCTA GGCTAGCTACAACGA TGTCCCAG	7138
9129	GGACAGUA G CUUAGCGC	2342	GCGCTAAG GGCTAGCTACAACGA TACTGTCC	7139
9124	GUAGCUUA G CGCGAACA	2343	TGTTCGCG GGCTAGCTACAACGA TAAGCTAC	7140
9122	AGCUUAGC G CGAACACU	2344	AGTGTTCG GGCTAGCTACAACGA GCTAAGCT	7141
9118	UAGCGCGA A CACUUCUG	2345	CAGAAGTG GGCTAGCTACAACGA TCGCGCTA	7142
9116	GCGCGAAC A CUUCUGGC	2346	GCCAGAAG GGCTAGCTACAACGA GTTCGCGC	7143
9109	CACUUCUG G CCCGAUGU	2347	ACATCGGG GGCTAGCTACAACGA CAGAAGTG	7144
9104	CUGGCCCG A UGUCUCCA	2348	TGGAGACA GGCTAGCTACAACGA CGGGCCAG	7145
9102	GGCCCGAU G UCUCCAGG	2349	CCTGGAGA GGCTAGCTACAACGA ATCGGGCC	7146
9094	GUCUCCAG G UUCGCAAG	2350	CTTGCGAA GGCTAGCTACAACGA CTGGAGAC	7147
9090	CCAGGUUC G CAAGGGUG	2351	CACCCTTG GGCTAGCTACAACGA GAACCTGG	7148
9084	UCGCAAGG G UGGUACCC	2352	GGGTACCA GGCTAGCTACAACGA CCTTGCGA	7149
9081	CAAGGGUG G UACCCCAA	2353	TTGGGGTA GGCTAGCTACAACGA CACCCTTG	7150
9079	AGGGUGGU A CCCCAAGU	2354	ACTTGGGG GGCTAGCTACAACGA ACCACCCT	7151
9072	UACCCCAA G UUUCCUGA	2355	TCAGGAAA GGCTAGCTACAACGA TTGGGGTA	7152
9062	UUCCUGAG G CAUGAUGC	2356	GCATCATG GGCTAGCTACAACGA CTCAGGAA	7153
9060	CCUGAGGC A UGAUGCCA	2357	TGGCATCA GGCTAGCTACAACGA GCCTCAGG	7154
9057	GAGGCAUG A UGCCACCC	2358	GGGTGGCA GGCTAGCTACAACGA CATGCCTC	7155
9055	GGCAUGAU G CCACCCUA	2359	TAGGGTGG GGCTAGCTACAACGA ATCATGCC	7156
9052	AUGAUGCC A CCCUAUUG	2360	CAATAGGG GGCTAGCTACAACGA GGCATCAT	7157
9047	GCCACCCU A UUGAUUUC	2361	GAAATCAA GGCTAGCTACAACGA AGGGTGGC	7158
9043	CCCUAUUG A UUUCACCU	2362	AGGTGAAA GGCTAGCTACAACGA CAATAGGG	7159
9038	UUGAUUUC A CCUGGGGA	2363	TCCCCAGG GGCTAGCTACAACGA GAAATCAA	7160
9029	CCUGGGGA G UAACUAUG	2364	CATAGTTA GGCTAGCTACAACGA TCCCCAGG	7161
9026	GGGGAGUA A CUAUGGAG	2365	CTCCATAG GGCTAGCTACAACGA TACTCCCC	7162
9023	GAGUAACU A UGGAGUGA	2366	TCACTCCA GGCTAGCTACAACGA AGTTACTC	7163
9018	ACUAUGGA G UGAAAAUG	2367	CATTTTCA GGCTAGCTACAACGA TCCATAGT	7164
9012	GAGUGAAA A UGCGCUAA	2368	TTAGCGCA GGCTAGCTACAACGA TTTCACTC	7165
9010	GUGAAAAU G CGCUAAGA	2369	TCTTAGCG GGCTAGCTACAACGA ATTTTCAC	7166
9008	GAAAAUGC G CUAAGACC	2370	GGTCTTAG GGCTAGCTACAACGA GCATTTTC	7167
9002	GCGCUAAG A CCAUGGAG	2371	CTCCATGG GGCTAGCTACAACGA CTTAGCGC	7168
8999	CUAAGACC A UGGAGUCG	2372	CGACTCCA GGCTAGCTACAACGA GGTCTTAG	7169
8994	ACCAUGGA G UCGCUGAA	2373	TTCAGCGA GGCTAGCTACAACGA TCCATGGT	7170
8991	AUGGAGUC G CUGAAUGA	2374	TCATTCAG GGCTAGCTACAACGA GACTCCAT	7171
8986	GUCGCUGA A UGAUCUGA	2375	TCAGATCA GGCTAGCTACAACGA TCAGCGAC	7172
8983	GCUGAAUG A UCUGAGGU	2376	ACCTCAGA GGCTAGCTACAACGA CATTCAGC	7173
8976	GAUCUGAG G UAGGUCAA	2377	TTGACCTA GGCTAGCTACAACGA CTCAGATC	7174
8972	UGAGGUAG G UCAAGUGG	2378	CCACTTGA GGCTAGCTACAACGA CTACCTCA	7175
8967	UAGGUCAA G UGGCUCAA	2379	TTGAGCCA GGCTAGCTACAACGA TTGACCTA	7176
8964	GUCAAGUG G CUCAAUGG	2380	CCATTGAG GGCTAGCTACAACGA CACTTGAC	7177
8959	GUGGCUCA A UGGAGUAA	2381	TTACTCCA GGCTAGCTACAACGA TGAGCCAC	7178
8954	UCAAUGGA G UAACAAGC	2382	GCTTGTTA GGCTAGCTACAACGA TCCATTGA	7179
8951	AUGGAGUA A CAAGCCCC	2383	GGGGCTTG GGCTAGCTACAACGA TACTCCAT	7180
8947	AGUAACAA G CCCCGUAG	2384	CTACGGGG GGCTAGCTACAACGA TTGTTACT	7181
8942	CAAGCCCC G UAGAUCUG	2385	CAGATCTA GGCTAGCTACAACGA GGGGCTTG	7182
8938	CCCCGUAG A UCUGGCAG	2386	CTGCCAGA GGCTAGCTACAACGA CTACGGGG	7183

8933	UAGAUCUG G CAGUCUAG	2387	CTAGACTG GGCTAGCTACAACGA CAGATCTA	7184
8930	AUCUGGCA G UCUAGGGC	2388	GCCCTAGA GGCTAGCTACAACGA TGCCAGAT	7185
8923	AGUCUAGG G CUUUCUCA	2389	TGAGAAAG GGCTAGCTACAACGA CCTAGACT	7186
8913	UUUCUCAA G UUGCUCCU	2390	AGGAGCAA GGCTAGCTACAACGA TTGAGAAA	7187
8910	CUCAAGUU G CUCCUGGG	2391	CCCAGGAG GGCTAGCTACAACGA AACTTGAG	7188
8902	GCUCCUGG G CUAGAAGG	2392	CCTTCTAG GGCTAGCTACAACGA CCAGGAGC	7189
8893	CUAGAAGG A UGGAGAAG	2393	CTTCTCCA GGCTAGCTACAACGA CCTTCTAG	7190
8882	GAGAAGAA G UGAGUCAU	2394	ATGACTCA GGCTAGCTACAACGA TTCTTCTC	7191
8878	AGAAGUGA G UCAUCAGA	2395	TCTGATGA GGCTAGCTACAACGA TCACTTCT	7192
8875	AGUGAGUC A UCAGAAUC	2396	GATTCTGA GGCTAGCTACAACGA GACTCACT	7193
8869	UCAUCAGA A UCAUCCUU	2397	AAGGATGA GGCTAGCTACAACGA TCTGATGA	7194
8866	UCAGAAUC A UCCUUACC	2398	GGTAAGGA GGCTAGCTACAACGA GATTCTGA	7195
8860	UCAUCCUU A CCCAUAGA	2399	TCTATGGG GGCTAGCTACAACGA AAGGATGA	7196
8856	CCUUACCC A UAGAGUGG	2400	CCACTCTA GGCTAGCTACAACGA GGGTAAGG	7197
8851	CCCAUAGA G UGGGUGCA	2401	TGCACCCA GGCTAGCTACAACGA TCTATGGG	7198
8847	UAGAGUGG G UGCAAACA	2402	TGTTTGCA GGCTAGCTACAACGA CCACTCTA	7199
8845	GAGUGGGU G CAAACAUG	2403	CATGTTTG GGCTAGCTACAACGA ACCCACTC	7200
8841	GGGUGCAA A CAUGAUGA	2404	TCATCATG GGCTAGCTACAACGA TTGCACCC	7201
8839	GUGCAAAC A UGAUGAUG	2405	CATCATCA GGCTAGCTACAACGA GTTTGCAC	7202
8836	CAAACAUG A UGAUGUUG	2406	CAACATCA GGCTAGCTACAACGA CATGTTTG	7203
8833	ACAUGAUG A UGUUGCCU	2407	AGGCAACA GGCTAGCTACAACGA CATCATGT	7204
8831	AUGAUGAU G UUGCCUAG	2408	CTAGGCAA GGCTAGCTACAACGA ATCATCAT	7205
8828	AUGAUGUU G CCUAGCCA	2409	TGGCTAGG GGCTAGCTACAACGA AACATCAT	7206
8823	GUUGCCUA G CCAGGAGU	2410	ACTCCTGG GGCTAGCTACAACGA TAGGCAAC	7207
8816	AGCCAGGA G UUGACUGG	2411	CCAGTCAA GGCTAGCTACAACGA TCCTGGCT	7208
8812	AGGAGUUG A CUGGAGUG	2412	CACTCCAG GGCTAGCTACAACGA CAACTCCT	7209
8806	UGACUGGA G UGCUUCUA	2413	TAGAAGCA GGCTAGCTACAACGA TCCAGTCA	7210
8804	ACUGGAGU G CUUCUAGC	2414	GCTAGAAG GGCTAGCTACAACGA ACTCCAGT	7211
8797	UGCUUCUA G CUGUCUCC	2415	GGAGACAG GGCTAGCTACAACGA TAGAAGCA	7212
8794	UUCUAGCU G UCUCCCAC	2416	GTGGGAGA GGCTAGCTACAACGA AGCTAGAA	7213
8787	UGUCUCCC A CGCAGCCC	2417	GGGCTGCG GGCTAGCTACAACGA GGGAGACA	7214
8785	UCUCCCAC G CAGCCCGC	2418	GCGGGCTG GGCTAGCTACAACGA GTGGGAGA	7215
8782	CCCACGCA G CCCGCGCA	2419	TGCGCGGG GGCTAGCTACAACGA TGCGTGGG	7216
8778	CGCAGCCC G CGCAAGGG	2420	CCCTTGCG GGCTAGCTACAACGA GGGCTGCG	7217
8776	CAGCCCGC G CAAGGGGG	2421	CCCCCTTG GGCTAGCTACAACGA GCGGGCTG	7218
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8756	GUGGGGUC A CGGGUGAG	2425	CTCACCCG GGCTAGCTACAACGA GACCCCAC	7222
8752	GGUCACGG G UGAGGUAG	2426	CTACCTCA GGCTAGCTACAACGA CCGTGACC	7223
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8744	GUGAGGUA G UACACCCU	2428	AGGGTGTA GGCTAGCTACAACGA TACCTCAC	7225
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8740	GGUAGUAC A CCCUUUUG	2430	CAAAAGGG GGCTAGCTACAACGA GTACTACC	7227
8732	ACCCUUUU G CCAGAUGC	2431	GCATCTGG GGCTAGCTACAACGA AAAAGGGT	7228
8727	UUUGCCAG A UGCAUCGU	2432	ACGATGCA GGCTAGCTACAACGA CTGGCAAA	7229
8725	UGCCAGAU G CAUCGUGU	2433	ACACGATG GGCTAGCTACAACGA ATCTGGCA	7230
8723	CCAGAUGC A UCGUGUGC	2434	GCACACGA GGCTAGCTACAACGA GCATCTGG	7231
8720	GAUGCAUC G UGUGCAAC	2435	GTTGCACA GGCTAGCTACAACGA GATGCATC	7232
8718	UGCAUCGU G UGCAACUG	2436	CAGTTGCA GGCTAGCTACAACGA ACGATGCA	7233
8716	CAUCGUGU G CAACUGAU	2437	ATCAGTTG GGCTAGCTACAACGA ACACGATG	7234
8713	CGUGUGCA A CUGAUACG	2438	CGTATCAG GGCTAGCTACAACGA TGCACACG	7235
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8707	CAACUGAU A CGUUGGAG	2440	CTCCAACG GGCTAGCTACAACGA ATCAGTTG	7237
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8696	UUGGAGGA G CAUGAUGU	2442	ACATCATG GGCTAGCTACAACGA TCCTCCAA	7239
8694	GGAGGAGC A UGAUGUUA	2443	TAACATCA GGCTAGCTACAACGA GCTCCTCC	7240

8691	GGAGCAUG A UGUUAUCA	2444	TGATAACA GGCTAGCTACAACGA CATGCTCC	7241
8689	AGCAUGAU G UUAUCAAC	2445	GTTGATAA GGCTAGCTACAACGA ATCATGCT	7242
8686	AUGAUGUU A UCAACUCC	2446	GGAGTTGA GGCTAGCTACAACGA AACATCAT	7243
8682	UGUUAUCA A CUCCAAGU	2447	ACTTGGAG GGCTAGCTACAACGA TGATAACA	7244
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8634	GGCAGAGU A CCUAGUCA	2456	TGACTAGG GGCTAGCTACAACGA ACTCTGCC	7253
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8626	ACCUAGUC A UAGCCUCC	2458	GGAGGCTA GGCTAGCTACAACGA GACTAGGT	7255
8623	UAGUCAUA G CCUCCGUG	2459	CACGGAGG GGCTAGCTACAACGA TATGACTA	7256
8617	UAGCCUCC G UGAAGACU	2460	AGTCTTCA GGCTAGCTACAACGA GGAGGCTA	7257
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8607	GAAGACUC G UAGGCUCG	2462	CGAGCCTA GGCTAGCTACAACGA GAGTCTTC	7259
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8578	GGGUCCCC G CACUUUCA	2468	TGAAAGTG GGCTAGCTACAACGA GGGGACCC	7265
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8542	CUCCACAC A CGAGCAUC	2478	GATGCTCG GGCTAGCTACAACGA GTGTGGAG	7275
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7963	CCUUCCAC A CGGAGCGG	2615	CCGCTCCG GGCTAGCTACAACGA GTGGAAGG	7412
7958	CACACGGA G CGGAUGUG	2616	CACATCCG GGCTAGCTACAACGA TCCGTGTG	7413
7954	CGGAGCGG A UGUGGUUG	2617	CAACCACA GGCTAGCTACAACGA CCGCTCCG	7414
7952	GAGCGGAU G UGGUUGAC	2618	GTCAACCA GGCTAGCTACAACGA ATCCGCTC	7415
7949	CGGAUGUG G UUGACGGC	2619	GCCGTCAA GGCTAGCTACAACGA CACATCCG	7416
7945	UGUGGUUG A CGGCCCCG	2620	CGGGGCCG GGCTAGCTACAACGA CAACCACA	7417
7942	GGUUGACG G CCCCGCUG	2621	CAGCGGGG GGCTAGCTACAACGA CGTCAACC	7418
7937	ACGGCCCC G CUGGAUAG	2622	CTATCCAG GGCTAGCTACAACGA GGGGCCGT	7419
7932	CCCGCUGG A UAGGUUCC	2623	GGAACCTA GGCTAGCTACAACGA CCAGCGGG	7420
7928	CUGGAUAG G UUCCGGAC	2624	GTCCGGAA GGCTAGCTACAACGA CTATCCAG	7421
7921	GGUUCCGG A CGUCCUUU	2625	AAAGGACG GGCTAGCTACAACGA CCGGAACC	7422
7919	UUCCGGAC G UCCUUUGC	2626	GCAAAGGA GGCTAGCTACAACGA GTCCGGAA	7423
7912	CGUCCUUU G CCCCAUAA	2627	TTATGGGG GGCTAGCTACAACGA AAAGGACG	7424
7907	UUUGCCCC A UAACCAAA	2628	TTTGGTTA GGCTAGCTACAACGA GGGGCAAA	7425
7904	GCCCCAUA A CCAAAUUU	2629	AAATTTGG GGCTAGCTACAACGA TATGGGGC	7426
7899	AUAACCAA A UUUGGACC	2630	GGTCCAAA GGCTAGCTACAACGA TTGGTTAT	7427
7893	AAAUUUGG A CCUGGCCG	2631	CGGCCAGG GGCTAGCTACAACGA CCAAATTT	7428
7888	UGGACCUG G CCGAAUGU	2632	ACATTCGG GGCTAGCTACAACGA CAGGTCCA	7429
7883	CUGGCCGA A UGUGGGGG	2633	CCCCCACA GGCTAGCTACAACGA TCGGCCAG	7430
7881	GGCCGAAU G UGGGGGCG	2634	CGCCCCCA GGCTAGCTACAACGA ATTCGGCC	7431
7875	AUGUGGGG G CGUCAGUC	2635	GACTGACG GGCTAGCTACAACGA CCCCACAT	7432
7873	GUGGGGGC G UCAGUCUG	2636	CAGACTGA GGCTAGCTACAACGA GCCCCCAC	7433
7869	GGGCGUCA G UCUGCAGG	2637	CCTGCAGA GGCTAGCTACAACGA TGACGCCC	7434
7865	GUCAGUCU G CAGGCUUC	2638	GAAGCCTG GGCTAGCTACAACGA AGACTGAC	7435
7861	GUCUGCAG G CUUCCUCU	2639	AGAGGAAG GGCTAGCTACAACGA CTGCAGAC	7436
7852	CUUCCUCU A CGGAUAGA	2640	TCTATCCG GGCTAGCTACAACGA AGAGGAAG	7437
7848	CUCUACGG A UAGAAGUU	2641	AACTTCTA GGCTAGCTACAACGA CCGTAGAG	7438
7842	GGAUAGAA G UUUAGCCU	2642	AGGCTAAA GGCTAGCTACAACGA TTCTATCC	7439
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7831	UAGCCUUA A CUGUGGAC	2644	GTCCACAG GGCTAGCTACAACGA TAAGGCTA	7441
7828	CCUUAACU G UGGACGCC	2645	GGCGTCCA GGCTAGCTACAACGA AGTTAAGG	7442
7824	AACUGUGG A CGCCUUCG	2646	CGAAGGCG GGCTAGCTACAACGA CCACAGTT	7443
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7816	ACGCCUUC G CCUUCAUC	2648	GATGAAGG GGCTAGCTACAACGA GAAGGCGT	7445
7810	UCGCCUUC A UCUCCUUG	2649	CAAGGAGA GGCTAGCTACAACGA GAAGGCGA	7446
7800	CUCCUUGA G CACGUCCC	2650	GGGACGTG GGCTAGCTACAACGA TCAAGGAG	7447
7798	CCUUGAGC A CGUCCCGG	2651	CCGGGACG GGCTAGCTACAACGA GCTCAAGG	7448
7796	UUGAGCAC G UCCCGGUA	2652	TACCGGGA GGCTAGCTACAACGA GTGCTCAA	7449
7790	ACGUCCCG G UAGUGGUC	2653	GACCACTA GGCTAGCTACAACGA CGGGACGT	7450
7787	UCCCGGUA G UGGUCGUC	2654	GACGACCA GGCTAGCTACAACGA TACCGGGA	7451
7784	CGGUAGUG G UCGUCCAG	2655	CTGGACGA GGCTAGCTACAACGA CACTACCG	7452
7781	UAGUGGUC G UCCAGGAC	2656	GTCCTGGA GGCTAGCTACAACGA GACCACTA	7453
7774	CGUCCAGG A CUUGCAGU	2657	ACTGCAAG GGCTAGCTACAACGA CCTGGACG	7454
7770	CAGGACUU G CAGUCUGU	2658	ACAGACTG GGCTAGCTACAACGA AAGTCCTG	7455
7767	GACUUGCA G UCUGUCAA	2659	TTGACAGA GGCTAGCTACAACGA TGCAAGTC	7456
7763	UGCAGUCU G UCAAAGGU	2660	ACCTTTGA GGCTAGCTACAACGA AGACTGCA	7457
7756	UGUCAAAG G UGACCUUC	2661	GAAGGTCA GGCTAGCTACAACGA CTTTGACA	7458
7753	CAAAGGUG A CCUUCUUC	2662	GAAGAAGG GGCTAGCTACAACGA CACCTTTG	7459
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7740	CUUCUGCC G CUGGCUUG	2664	CAAGCCAG GGCTAGCTACAACGA GGCAGAAG	7461
7736	UGCCGCUG G CUUGCGCU	2665	AGCGCAAG GGCTAGCTACAACGA CAGCGGCA	7462
7732	GCUGGCUU G CGCUGCGA	2666	TCGCAGCG GGCTAGCTACAACGA AAGCCAGC	7463
7730	UGGCUUGC G CUGCGAGA	2667	TCTCGCAG GGCTAGCTACAACGA GCAAGCCA	7464
7727	CUUGCGCU G CGAGAUGU	2668	ACATCTCG GGCTAGCTACAACGA AGCGCAAG	7465
7722	GCUGCGAG A UGUUGUAG	2669	CTACAACA GGCTAGCTACAACGA CTCGCAGC	7466
7720	UGCGAGAU G UUGUAGCG	2670	CGCTACAA GGCTAGCTACAACGA ATCTCGCA	7467
7717	GAGAUGUU G UAGCGUAG	2671	CTACGCTA GGCTAGCTACAACGA AACATCTC	7468

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7712	GUUGUAGC G UAGACCAU	2673	ATGGTCTA GGCTAGCTACAACGA GCTACAAC	7470
7708	UAGCGUAG A CCAUGUUG	2674	CAACATGG GGCTAGCTACAACGA CTACGCTA	7471
7705	CGUAGACC A UGUUGUGG	2675	CCACAACA GGCTAGCTACAACGA GGTCTACG	7472
7703	UAGACCAU G UUGUGGUG	2676	CACCACAA GGCTAGCTACAACGA ATGGTCTA	7473
7700	ACCAUGUU G UGGUGACG	2677	CGTCACCA GGCTAGCTACAACGA AACATGGT	7474
7697	AUGUUGUG G UGACGCAG	2678	CTGCGTCA GGCTAGCTACAACGA CACAACAT	7475
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7692	GUGGUGAC G CAGCAAAG	2680	CTTTGCTG GGCTAGCTACAACGA GTCACCAC	7477
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7682	AGCAAAGA G UUGCUCAA	2682	TTGAGCAA GGCTAGCTACAACGA TCTTTGCT	7479
7679	AAAGAGUU G CUCAACGC	2683	GCGTTGAG GGCTAGCTACAACGA AACTCTTT	7480
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7672	UGCUCAAC G CGUUGAUG	2685	CATCAACG GGCTAGCTACAACGA GTTGAGCA	7482
7670	CUCAACGC G UUGAUGGG	2686	CCCATCAA GGCTAGCTACAACGA GCGTTGAG	7483
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7662	GUUGAUGG G CAACUUGC	2688	GCAAGTTG GGCTAGCTACAACGA CCATCAAC	7485
7659	GAUGGGCA A CUUGCUUU	2689	AAAGCAAG GGCTAGCTACAACGA TGCCCATC	7486
7655	GGCAACUU G CUUUCCUC	2690	GAGGAAAG GGCTAGCTACAACGA AAGTTGCC	7487
7645	UUUCCUCC G CAGCGCAU	2691	ATGCGCTG GGCTAGCTACAACGA GGAGGAAA	7488
7642	CCUCCGCA G CGCAUGGC	2692	GCCATGCG GGCTAGCTACAACGA TGCGGAGG	7489
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7633	CGCAUGGC G UGAUCAGG	2696	CCTGATCA GGCTAGCTACAACGA GCCATGCG	7493
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7093	CCAGGGUA A CUACCUUA	2811	TAAGGTAG GGCTAGCTACAACGA TACCCTGG	7608
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6986	UGGGUAAU G UAUGUCGC	2836	GCGACATA GGCTAGCTACAACGA ATTACCCA	7633
6984	GGUAAUGU A UGUCGCCU	2837	AGGCGACA GGCTAGCTACAACGA ACATTACC	7634
6982	UAAUGUAU G UCGCCUUC	2838	GAAGGCGA GGCTAGCTACAACGA ATACATTA	7635
6979	UGUAUGUC G CCUUCGAA	2839	TTCGAAGG GGCTAGCTACAACGA GACATACA	7636
6966	CGAAGAAG G CGCAGACA	2840	TGTCTGCG GGCTAGCTACAACGA CTTCTTCG	7637
6964	AAGAAGGC G CAGACAGC	2841	GCTGTCTG GGCTAGCTACAACGA GCCTTCTT	7638
6960	AGGCGCAG A CAGCUGGC	2842	GCCAGCTG GGCTAGCTACAACGA CTGCGCCT	7639

6957	CGCAGACA G CUGGCUAG	2843	CTAGCCAG GGCTAGCTACAACGA TGTCTGCG	7640
6953	GACAGCUG G CUAGCUGA	2844	TCAGCTAG GGCTAGCTACAACGA CAGCTGTC	7641
6949	GCUGGCUA G CUGAGGAG	2845	CTCCTCAG GGCTAGCTACAACGA TAGCCAGC	7642
6941	GCUGAGGA G CUGGCCAA	2846	TTGGCCAG GGCTAGCTACAACGA TCCTCAGC	7643
6937	AGGAGCUG G CCAAGGAG	2847	CTCCTTGG GGCTAGCTACAACGA CAGCTCCT	7644
6921	GGGGGGAG A CCCCCUGG	2848	CCAGGGGG GGCTAGCTACAACGA CTCCCCCC	7645
6913	ACCCCCUG G CCAGCCUA	2849	TAGGCTGG GGCTAGCTACAACGA CAGGGGGT	7646
6909	CCUGGCCA G CCUACGCU	2850	AGCGTAGG GGCTAGCTACAACGA TGGCCAGG	7647
6905	GCCAGCCU A CGCUUAGC	2851	GCTAAGCG GGCTAGCTACAACGA AGGCTGGC	7648
6903	CAGCCUAC G CUUAGCCG	2852	CGGCTAAG GGCTAGCTACAACGA GTAGGCTG	7649
6898	UACGCUUA G CCGUCUCU	2853	AGAGACGG GGCTAGCTACAACGA TAAGCGTA	7650
6895	GCUUAGCC G UCUCUCCU	2854	AGGAGAGA GGCTAGCTACAACGA GGCTAAGC	7651
6886	UCUCUCCU G UAAUGUGG	2855	CCACATTA GGCTAGCTACAACGA AGGAGAGA	7652
6883	CUCCUGUA A UGUGGGAG	2856	CTCCCACA GGCTAGCTACAACGA TACAGGAG	7653
6881	CCUGUAAU G UGGGAGGG	2857	CCCTCCCA GGCTAGCTACAACGA ATTACAGG	7654
6872	UGGGAGGG G UCGGUGAG	2858	CTCACCGA GGCTAGCTACAACGA CCCTCCCA	7655
6868	AGGGGUCG G UGAGCAUG	2859	CATGCTCA GGCTAGCTACAACGA CGACCCCT	7656
6864	GUCGGUGA G CAUGGACG	2860	CGTCCATG GGCTAGCTACAACGA TCACCGAC	7657
6862	CGGUGAGC A UGGACGUG	2861	CACGTCCA GGCTAGCTACAACGA GCTCACCG	7658
6858	GAGCAUGG A CGUGAGCA	2862	TGCTCACG GGCTAGCTACAACGA CCATGCTC	7659
6856	GCAUGGAC G UGAGCACU	2863	AGTGCTCA GGCTAGCTACAACGA GTCCATGC	7660
6852	GGACGUGA G CACUGCUA	2864	TAGCAGTG GGCTAGCTACAACGA TCACGTCC	7661
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6847	UGAGCACU G CUACAUCC	2866	GGATGTAG GGCTAGCTACAACGA AGTGCTCA	7663
6844	GCACUGCU A CAUCCGGU	2867	ACCGGATG GGCTAGCTACAACGA AGCAGTGC	7664
6842	ACUGCUAC A UCCGGUUC	2868	GAACCGGA GGCTAGCTACAACGA GTAGCAGT	7665
6837	UACAUCCG G UUCGGGCU	2869	AGCCCGAA GGCTAGCTACAACGA CGGATGTA	7666
6831	CGGUUCGG G CUCGCAUG	2870	CATGCGAG GGCTAGCTACAACGA CCGAACCG	7667
6827	UCGGGCUC G CAUGGGAG	2871	CTCCCATG GGCTAGCTACAACGA GAGCCCGA	7668
6825	GGGCUCGC A UGGGAGCU	2872	AGCTCCCA GGCTAGCTACAACGA GCGAGCCC	7669
6819	GCAUGGGA G CUGUGACC	2873	GGTCACAG GGCTAGCTACAACGA TCCCATGC	7670
6816	UGGGAGCU G UGACCCAA	2874	TTGGGTCA GGCTAGCTACAACGA AGCTCCCA	7671
6813	GAGCUGUG A CCCAACCA	2875	TGGTTGGG GGCTAGCTACAACGA CACAGCTC	7672
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6792	UUGGUUGA G CCCGACCU	2880	AGGTCGGG GGCTAGCTACAACGA TCAACCAA	7677
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6780	GACCUGGA A UGUGACCU	2882	AGGTCACA GGCTAGCTACAACGA TCCAGGTC	7679
6778	CCUGGAAU G UGACCUCC	2883	GGAGGTCA GGCTAGCTACAACGA ATTCCAGG	7680
6775	GGAAUGUG A CCUCCUCC	2884	GGAGGAGG GGCTAGCTACAACGA CACATTCC	7681
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6748	GUCCACAC G CCGGAGCG	2889	CGCTCCGG GGCTAGCTACAACGA GTGTGGAC	7686
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6732	GUUUCUGU G CAGGCGUA	2893	TACGCCTG GGCTAGCTACAACGA ACAGAAAC	7690
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6724	GCAGGCGU A CCCCAUCC	2896	GGATGGGG GGCTAGCTACAACGA ACGCCTGC	7693
6719	CGUACCCC A UCCACUUC	2897	GAAGTGGA GGCTAGCTACAACGA GGGGTACG	7694
6715	CCCCAUCC A CUUCCGUG	2898	CACGGAAG GGCTAGCTACAACGA GGATGGGG	7695
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6683	GGAACCUG G CACGGGCA	2903	TGCCCGTG GGCTAGCTACAACGA CAGGTTCC	7700
6681	AACCUGGC A CGGGCAUU	2904	AATGCCCG GGCTAGCTACAACGA GCCAGGTT	7701
6677	UGGCACGG G CAUUUUAC	2905	GTAAAATG GGCTAGCTACAACGA CCGTGCCA	7702
6675	GCACGGGC A UUUUACGU	2906	ACGTAAAA GGCTAGCTACAACGA GCCCGTGC	7703
6670	GGCAUUUU A CGUUGUCA	2907	TGACAACG GGCTAGCTACAACGA AAAATGCC	7704
6668	CAUUUUAC G UUGUCAGU	2908	ACTGACAA GGCTAGCTACAACGA GTAAAATG	7705
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6641	GUCACGUA G UGGAAAUC	2917	GATTTCCA GGCTAGCTACAACGA TACGTGAC	7714
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6595	CAGCGGCC A CCCGCCAU	2928	ATGGCGGG GGCTAGCTACAACGA GGCCGCTG	7725
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6585	CCGCCAUA G CGCCCUAG	2931	CTAGGGCG GGCTAGCTACAACGA TATGGCGG	7728
6583	GCCAUAGC G CCCUAGAA	2932	TTCTAGGG GGCTAGCTACAACGA GCTATGGC	7729
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6242	GUGGAGCA G UCCUCAUU	3017	AATGAGGA GGCTAGCTACAACGA TGCTCCAC	7814
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6219	CUGAUGGA G CCUCCUCA	3022	TGAGGAGG GGCTAGCTACAACGA TCCATCAG	7819
6210	CCUCCUCA G CAGCUGAG	3023	CTCAGCTG GGCTAGCTACAACGA TGAGGAGG	7820
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6196	GAGUGAUG G UGAGGCUG	3027	CAGCCTCA GGCTAGCTACAACGA CATCACTC	7824
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6170	UGUGUGAC G CGCGCCGC	3033	GCGGCGCG GGCTAGCTACAACGA GTCACACA	7830
6168	UGUGACGC G CGCCGCUG	3034	CAGCGGCG GGCTAGCTACAACGA GCGTCACA	7831
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6163	CGCGCGCC G CUGCGUCG	3036	CGACGCAG GGCTAGCTACAACGA GGCGCGCG	7833
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6127	UGGGGGAG A CAUGGUUG	3046	CAACCATG GGCTAGCTACAACGA CTCCCCCA	7843
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6096	CGCUAUCA G CCGAUUCA	3055	TGAATCGG GGCTAGCTACAACGA TGATAGCG	7852
6092	AUCAGCCG A UUCAUCCA	3056	TGGATGAA GGCTAGCTACAACGA CGGCTGAT	7853
6088	GCCGAUUC A UCCACUGC	3057	GCAGTGGA GGCTAGCTACAACGA GAATCGGC	7854
6084	AUUCAUCC A CUGCACAG	3058	CTGTGCAG GGCTAGCTACAACGA GGATGAAT	7855
6081	CAUCCACU G CACAGCGC	3059	GCGCTGTG GGCTAGCTACAACGA AGTGGATG	7856
6079	UCCACUGC A CAGCGCCC	3060	GGGCGCTG GGCTAGCTACAACGA GCAGTGGA	7857
6076	ACUGCACA G CGCCCUCU	3061	AGAGGGCG GGCTAGCTACAACGA TGTGCAGT	7858
6074	UGCACAGC G CCCUCUCC	3062	GGAGAGGG GGCTAGCTACAACGA GCTGTGCA	7859
6062	UCUCCUGG G CCCACAUG	3063	CATGTGGG GGCTAGCTACAACGA CCAGGAGA	7860
6058	CUGGGCCC A CAUGCCGA	3064	TCGGCATG GGCTAGCTACAACGA GGGCCCAG	7861
6056	GGGCCCAC A UGCCGACG	3065	CGTCGGCA GGCTAGCTACAACGA GTGGGCCC	7862
6054	GCCCACAU G CCGACGCA	3066	TGCGTCGG GGCTAGCTACAACGA ATGTGGGC	7863
6050	ACAUGCCG A CGCAGUAU	3067	ATACTGCG GGCTAGCTACAACGA CGGCATGT	7864
6048	AUGCCGAC G CAGUAUCG	3068	CGATACTG GGCTAGCTACAACGA GTCGGCAT	7865
6045	CCGACGCA G UAUCGCUG	3069	CAGCGATA GGCTAGCTACAACGA TGCGTCGG	7866
6043	GACGCAGU A UCGCUGCG	3070	CGCAGCGA GGCTAGCTACAACGA ACTGCGTC	7867

6040	GCAGUAUC G CUGCGCAC	3071	GTGCGCAG GGCTAGCTACAACGA GATACTGC	7868
6037	GUAUCGCU G CGCACACC	3072	GGTGTGCG GGCTAGCTACAACGA AGCGATAC	7869
6035	AUCGCUGC G CACACCAC	3073	GTGGTGTG GGCTAGCTACAACGA GCAGCGAT	7870
6033	CGCUGCGC A CACCACCC	3074	GGGTGGTG GGCTAGCTACAACGA GCGCAGCG	7871
6031	CUGCGCAC A CCACCCCG	3075	CGGGGTGG GGCTAGCTACAACGA GTGCGCAG	7872
6028	CGCACACC A CCCCGACG	3076	CGTCGGGG GGCTAGCTACAACGA GGTGTGCG	7873
6022	CCACCCCG A CGACCAGG	3077	CCTGGTCG GGCTAGCTACAACGA CGGGGTGG	7874
6019	CCCCGACG A CCAGGGCG	3078	CGCCCTGG GGCTAGCTACAACGA CGTCGGGG	7875
6013	CGACCAGG G CGCCAGGA	3079	TCCTGGCG GGCTAGCTACAACGA CCTGGTCG	7876
6011	ACCAGGGC G CCAGGAGA	3080	TCTCCTGG GGCTAGCTACAACGA GCCCTGGT	7877
5998	GAGAGAGG A UGGCAGGG	3081	CCCTGCCA GGCTAGCTACAACGA CCTCTCTC	7878
5995	AGAGGAUG G CAGGGAGU	3082	ACTCCCTG GGCTAGCTACAACGA CATCCTCT	7879
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5984	GGGAGUAA G UUGACCAG	3084	CTGGTCAA GGCTAGCTACAACGA TTACTCCC	7881
5980	GUAAGUUG A CCAGGUCC	3085	GGACCTGG GGCTAGCTACAACGA CAACTTAC	7882
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5968	GGUCCUCG G UAGAAGGC	3087	GCCTTCTA GGCTAGCTACAACGA CGAGGACC	7884
5961	GGUAGAAG G CAUCUCCC	3088	GGGAGATG GGCTAGCTACAACGA CTTCTACC	7885
5959	UAGAAGGC A UCUCCCCG	3089	CGGGGAGA GGCTAGCTACAACGA GCCTTCTA	7886
5951	AUCUCCCC G CUCAUGAC	3090	GTCATGAG GGCTAGCTACAACGA GGGGAGAT	7887
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5944	CGCUCAUG A CCUUGAAG	3092	CTTCAAGG GGCTAGCTACAACGA CATGAGCG	7889
5935	CCUUGAAG G CCACGAGA	3093	TCTCGTGG GGCTAGCTACAACGA CTTCAAGG	7890
5932	UGAAGGCC A CGAGAGCA	3094	TGCTCTCG GGCTAGCTACAACGA GGCCTTCA	7891
5926	CCACGAGA G CACCCGCC	3095	GGCGGGTG GGCTAGCTACAACGA TCTCGTGG	7892
5924	ACGAGAGC A CCCGCCAC	3096	GTGGCGGG GGCTAGCTACAACGA GCTCTCGT	7893
5920	GAGCACCC G CCACUCCU	3097	AGGAGTGG GGCTAGCTACAACGA GGGTGCTC	7894
5917	CACCCGCC A CUCCUGCU	3098	AGCAGGAG GGCTAGCTACAACGA GGCGGGTG	7895
5911	CCACUCCU G CUCCAUAG	3099	CTATGGAG GGCTAGCTACAACGA AGGAGTGG	7896
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5903	GCUCCAUA G CCCGCCAG	3101	CTGGCGGG GGCTAGCTACAACGA TATGGAGC	7898
5899	CAUAGCCC G CCAGAAUG	3102	CATTCTGG GGCTAGCTACAACGA GGGCTATG	7899
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5891	GCCAGAAU G UCUACAAG	3104	CTTGTAGA GGCTAGCTACAACGA ATTCTGGC	7901
5887	GAAUGUCU A CAAGCACC	3105	GGTGCTTG GGCTAGCTACAACGA AGACATTC	7902
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5854	UGCCAACA G CCGCGCCA	3113	TGGCGCGG GGCTAGCTACAACGA TGTTGGCA	7910
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5849	ACAGCCGC G CCAGCGAU	3115	ATCGCTGG GGCTAGCTACAACGA GCGGCTGT	7912
5845	CCGCGCCA G CGAUGCCG	3116	CGGCATCG GGCTAGCTACAACGA TGGCGCGG	7913
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5840	CCAGCGAU G CCGGCGCC	3118	GGCGCCGG GGCTAGCTACAACGA ATCGCTGG	7915
5836	CGAUGCCG G CGCCCACG	3119	CGTGGGCG GGCTAGCTACAACGA CGGCATCG	7916
5834	AUGCCGGC G CCCACGAA	3120	TTCGTGGG GGCTAGCTACAACGA GCCGGCAT	7917
5830	CGGCGCCC A CGAAGGCC	3121	GGCCTTCG GGCTAGCTACAACGA GGGCGCCG	7918
5824	CCACGAAG G CCGAAACG	3122	CGTTTCGG GGCTAGCTACAACGA CTTCGTGG	7919
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5815	CCGAAACG G CUCUGGGG	3124	CCCCAGAG GGCTAGCTACAACGA CGTTTCGG	7921
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5799	GGGAGCGA G UUGGGCGG	3126	CCGCCCAA GGCTAGCTACAACGA TCGCTCCC	7923
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5771	CCCAAGAU G UUGAACAG	3132	CTGTTCAA GGCTAGCTACAACGA ATCTTGGG	7929
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5758	ACAGGAGG G UGCUUUGG	3134	CCAAAGCA GGCTAGCTACAACGA CCTCCTGT	7931
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5704	UCAAUGAU G CUAUCGCG	3149	CGCGATAG GGCTAGCTACAACGA ATCATTGA	7946
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5693	AUCGCGGG G UUCCCAGG	3152	CCTGGGAA GGCTAGCTACAACGA CCCGCGAT	7949
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5631	CCACAUGU G CUUCGCCC	3168	GGGCGAAG GGCTAGCTACAACGA ACATGTGG	7965
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5191	CGUGUAGC G UAGGCUUU	3277	AAAGCCTA GGCTAGCTACAACGA GCTACACG	8074
5187	UAGCGUAG G CUUUAGCC	3278	GGCTAAAG GGCTAGCTACAACGA CTACGCTA	8075
5181	AGGCUUUA G CCGUGUGA	3279	TCACACGG GGCTAGCTACAACGA TAAAGCCT	8076
5178	CUUUAGCC G UGUGAGAC	3280	GTCTCACA GGCTAGCTACAACGA GGCTAAAG	8077
5176	UUAGCCGU G UGAGACAC	3281	GTGTCTCA GGCTAGCTACAACGA ACGGCTAA	8078
5171	CGUGUGAG A CACUUCCA	3282	TGGAAGTG GGCTAGCTACAACGA CTCACACG	8079
5169	UGUGAGAC A CUUCCACA	3283	TGTGGAAG GGCTAGCTACAACGA GTCTCACA	8080
5163	ACACUUCC A CAUUUGAU	3284	ATCAAATG GGCTAGCTACAACGA GGAAGTGT	8081
5161	ACUUCCAC A UUUGAUCC	3285	GGATCAAA GGCTAGCTACAACGA GTGGAAGT	8082
5156	CACAUUUG A UCCCACGA	3286	TCGTGGGA GGCTAGCTACAACGA CAAATGTG	8083
5151	UUGAUCCC A CGAUGGGG	3287	CCCCATCG GGCTAGCTACAACGA GGGATCAA	8084
5148	AUCCCACG A UGGGGGUG	3288	CACCCCCA GGCTAGCTACAACGA CGTGGGAT	8085
5142	CGAUGGGG G UGGAGCCU	3289	AGGCTCCA GGCTAGCTACAACGA CCCCATCG	8086
5137	GGGGUGGA G CCUGAGCC	3290	GGCTCAGG GGCTAGCTACAACGA TCCACCCC	8087
5131	GAGCCUGA G CCCUGGCG	3291	CGCCAGGG GGCTAGCTACAACGA TCAGGCTC	8088
5125	GAGCCCUG G CGCACACU	3292	AGTGTGCG GGCTAGCTACAACGA CAGGGCTC	8089
5123	GCCCUGGC G CACACUGU	3293	ACAGTGTG GGCTAGCTACAACGA GCCAGGGC	8090
5121	CCUGGCGC A CACUGUGG	3294	CCACAGTG GGCTAGCTACAACGA GCGCCAGG	8091
5119	UGGCGCAC A CUGUGGCU	3295	AGCCACAG GGCTAGCTACAACGA GTGCGCCA	8092
5116	CGCACACU G UGGCUUGG	3296	CCAAGCCA GGCTAGCTACAACGA AGTGTGCG	8093
5113	ACACUGUG G CUUGGUAU	3297	ATACCAAG GGCTAGCTACAACGA CACAGTGT	8094
5108	GUGGCUUG G UAUGCUAC	3298	GTAGCATA GGCTAGCTACAACGA CAAGCCAC	8095

5106	GGCUUGGU A UGCUACCA	3299	TGGTAGCA GGCTAGCTACAACGA ACCAAGCC	8096
5104	CUUGGUAU G CUACCAGG	3300	CCTGGTAG GGCTAGCTACAACGA ATACCAAG	8097
5101	GGUAUGCU A CCAGGUAG	3301	CTACCTGG GGCTAGCTACAACGA AGCATACC	8098
5096	GCUACCAG G UAGGGGAG	3302	CTCCCCTA GGCTAGCTACAACGA CTGGTAGC	8099
5087	UAGGGGAG G UUUUCUCC	3303	GGAGAAAA GGCTAGCTACAACGA CTCCCCTA	8100
5077	UUUCUCCU G CCUGCUUG	3304	CAAGCAGG GGCTAGCTACAACGA AGGAGAAA	8101
5073	UCCUGCCU G CUUGGUCU	3305	AGACCAAG GGCTAGCTACAACGA AGGCAGGA	8102
5068	CCUGCUUG G UCUGGGAC	3306	GTCCCAGA GGCTAGCTACAACGA CAAGCAGG	8103
5061	GGUCUGGG A CAAGAAGU	3307	ACTTCTTG GGCTAGCTACAACGA CCCAGACC	8104
5054	GACAAGAA G UGGGCAUC	3308	GATGCCCA GGCTAGCTACAACGA TTCTTGTC	8105
5050	AGAAGUGG G CAUCUAUG	3309	CATAGATG GGCTAGCTACAACGA CCACTTCT	8106
5048	AAGUGGGC A UCUAUGUG	3310	CACATAGA GGCTAGCTACAACGA GCCCACTT	8107
5044	GGGCAUCU A UGUGGGUG	3311	CACCCACA GGCTAGCTACAACGA AGATGCCC	8108
5042	GCAUCUAU G UGGGUGAG	3312	CTCACCCA GGCTAGCTACAACGA ATAGATGC	8109
5038	CUAUGUGG G UGAGGCCU	3313	AGGCCTCA GGCTAGCTACAACGA CCACATAG	8110
5033	UGGGUGAG G CCUGUGAA	3314	TTCACAGG GGCTAGCTACAACGA CTCACCCA	8111
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5023	CUGUGAAG A CACCCUCC	3316	GGAGGGTG GGCTAGCTACAACGA CTTCACAG	8113
5021	GUGAAGAC A CCCUCCCA	3317	TGGGAGGG GGCTAGCTACAACGA GTCTTCAC	8114
5010	CUCCCAGA A CUCCAGAU	3318	ATCTGGAG GGCTAGCTACAACGA TCTGGGAG	8115
5003	AACUCCAG A UGGUCCUG	3319	CAGGACCA GGCTAGCTACAACGA CTGGAGTT	8116
5000	UCCAGAUG G UCCUGGCA	3320	TGCCAGGA GGCTAGCTACAACGA CATCTGGA	8117
4994	UGGUCCUG G CAGAAGGG	3321	CCCTTCTG GGCTAGCTACAACGA CAGGACCA	8118
4986	GCAGAAGG G CAACCCUG	3322	CAGGGTTG GGCTAGCTACAACGA CCTTCTGC	8119
4983	GAAGGGCA A CCCUGGUG	3323	CACCAGGG GGCTAGCTACAACGA TGCCCTTC	8120
4977	CAACCCUG G UGUAUUUA	3324	TAAATACA GGCTAGCTACAACGA CAGGGTTG	8121
4975	ACCCUGGU G UAUUUAGG	3325	CCTAAATA GGCTAGCTACAACGA ACCAGGGT	8122
4973	CCUGGUGU A UUUAGGUA	3326	TACCTAAA GGCTAGCTACAACGA ACACCAGG	8123
4967	GUAUUUAG G UAAGCCCG	3327	CGGGCTTA GGCTAGCTACAACGA CTAAATAC	8124
4963	UUAGGUAA G CCCGCAAC	3328	GTTGCGGG GGCTAGCTACAACGA TTACCTAA	8125
4959	GUAAGCCC G CAACCUAA	3329	TTAGGTTG GGCTAGCTACAACGA GGGCTTAC	8126
4956	AGCCCGCA A CCUAACGG	3330	CCGTTAGG GGCTAGCTACAACGA TGCGGGCT	8127
4951	GCAACCUA A CGGAGGUC	3331	GACCTCCG GGCTAGCTACAACGA TAGGTTGC	8128
4945	UAACGGAG G UCUCGGCG	3332	CGCCGAGA GGCTAGCTACAACGA CTCCGTTA	8129
4939	AGGUCUCG G CGGGCGUG	3333	CACGCCCG GGCTAGCTACAACGA CGAGACCT	8130
4935	CUCGGCGG G CGUGAGCU	3334	AGCTCACG GGCTAGCTACAACGA CCGCCGAG	8131
4933	CGGCGGGC G UGAGCUCG	3335	CGAGCTCA GGCTAGCTACAACGA GCCCGCCG	8132
4929	GGGCGUGA G CUCGUACC	3336	GGTACGAG GGCTAGCTACAACGA TCACGCCC	8133
4925	GUGAGCUC G UACCAAGC	3337	GCTTGGTA GGCTAGCTACAACGA GAGCTCAC	8134
4923	GAGCUCGU A CCAAGCAC	3338	GTGCTTGG GGCTAGCTACAACGA ACGAGCTC	8135
4918	CGUACCAA G CACAUCCC	3339	GGGATGTG GGCTAGCTACAACGA TTGGTACG	8136
4916	UACCAAGC A CAUCCCGC	3340	GCGGGATG GGCTAGCTACAACGA GCTTGGTA	8137
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4899	GUCAUAGC A CUCACACA	3346	TGTGTGAG GGCTAGCTACAACGA GCTATGAC	8143
4895	UAGCACUC A CACAGGAC	3347	GTCCTGTG GGCTAGCTACAACGA GAGTGCTA	8144
4893	GCACUCAC A CAGGACCG	3348	CGGTCCTG GGCTAGCTACAACGA GTGAGTGC	8145
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4880	ACCGAGGA G UCGAACAU	3350	ATGTTCGA GGCTAGCTACAACGA TCCTCGGT	8147
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4873	AGUCGAAC A UGCCCGAA	3352	TTCGGGCA GGCTAGCTACAACGA GTTCGACT	8149
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4863	GCCCGAAG G CCGCUCUC	3354	GAGAGCGG GGCTAGCTACAACGA CTTCGGGC	8151
4860	CGAAGGCC G CUCUCCUG	3355	CAGGAGAG GGCTAGCTACAACGA GGCCTTCG	8152

4849	CUCCUGGA G UCACAAAC	3356	GTTTGTGA GGCTAGCTACAACGA TCCAGGAG	8153
4846	CUGGAGUC A CAAACCUG	3357	CAGGTTTG GGCTAGCTACAACGA GACTCCAG	8154
4842	AGUCACAA A CCUGUAUA	3358	TATACAGG GGCTAGCTACAACGA TTGTGACT	8155
4838	ACAAACCU G UAUAUGCC	3359	GGCATATA GGCTAGCTACAACGA AGGTTTGT	8156
4836	AAACCUGU A UAUGCCUC	3360	GAGGCATA GGCTAGCTACAACGA ACAGGTTT	8157
4834	ACCUGUAU A UGCCUCUC	3361	GAGAGGCA GGCTAGCTACAACGA ATACAGGT	8158
4832	CUGUAUAU G CCUCUCCU	3362	AGGAGAGG GGCTAGCTACAACGA ATATACAG	8159
4823	CCUCUCCU G CCCCUACC	3363	GGTAGGGG GGCTAGCTACAACGA AGGAGAGG	8160
4817	CUGCCCCU A CCGGUCCU	3364	AGGACCGG GGCTAGCTACAACGA AGGGGCAG	8161
4813	CCCUACCG G UCCUACCU	3365	AGGTAGGA GGCTAGCTACAACGA CGGTAGGG	8162
4808	CCGGUCCU A CCUCGCCU	3366	AGGCGAGG GGCTAGCTACAACGA AGGACCGG	8163
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4797	UCGCCUCU G CGAGCGGG	3368	CCCGCTCG GGCTAGCTACAACGA AGAGGCGA	8165
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4788	CGAGCGGG A CACUGCGU	3370	ACGCAGTG GGCTAGCTACAACGA CCCGCTCG	8167
4786	AGCGGGAC A CUGCGUCU	3371	AGACGCAG GGCTAGCTACAACGA GTCCCGCT	8168
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4781	GACACUGC G UCUUGGGG	3373	CCCCAAGA GGCTAGCTACAACGA GCAGTGTC	8170
4773	GUCUUGGG G CACGGUCG	3374	CGACCGTG GGCTAGCTACAACGA CCCAAGAC	8171
4771	CUUGGGGC A CGGUCGUC	3375	GACGACCG GGCTAGCTACAACGA GCCCCAAG	8172
4768	GGGGCACG G UCGUCGUC	3376	GACGACGA GGCTAGCTACAACGA CGTGCCCC	8173
4765	GCACGGUC G UCGUCUCA	3377	TGAGACGA GGCTAGCTACAACGA GACCGTGC	8174
4762	CGGUCGUC G UCUCAAUG	3378	CATTGAGA GGCTAGCTACAACGA GACGACCG	8175
4756	UCGUCUCA A UGGUGAAG	3379	CTTCACCA GGCTAGCTACAACGA TGAGACGA	8176
4753	UCUCAAUG G UGAAGGUA	3380	TACCTTCA GGCTAGCTACAACGA CATTGAGA	8177
4747	UGGUGAAG G UAGGGUCC	3381	GGACCCTA GGCTAGCTACAACGA CTTCACCA	8178
4742	AAGGUAGG G UCCAAGCU	3382	AGCTTGGA GGCTAGCTACAACGA CCTACCTT	8179
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4624	CCCCGCUG G CCGGUAUG	3415	CATACCGG GGCTAGCTACAACGA CAGCGGGG	8212
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4390	CCGGAGGC G UAGCGGUG	3468	CACCGCTA GGCTAGCTACAACGA GCCTCCGG	8265
4387	GAGGCGUA G CGGUGGCG	3469	CGCCACCG GGCTAGCTACAACGA TACGCCTC	8266

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4381	UAGCGGUG G CGAGCACG	3471	CGTGCTCG GGCTAGCTACAACGA CACCGCTA	8268
4377	GGUGGCGA G CACGACGA	3472	TCGTCGTG GGCTAGCTACAACGA TCGCCACC	8269
4375	UGGCGAGC A CGACGAGC	3473	GCTCGTCG GGCTAGCTACAACGA GCTCGCCA	8270
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4368	CACGACGA G CCGCGCUC	3475	GAGCGCGG GGCTAGCTACAACGA TCGTCGTG	8272
4365	GACGAGCC G CGCUCCAG	3476	CTGGAGCG GGCTAGCTACAACGA GGCTCGTC	8273
4363	CGAGCCGC G CUCCAGCC	3477	GGCTGGAG GGCTAGCTACAACGA GCGGCTCG	8274
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4336	GGUCCAGG A CUGUGCCG	3482	CGGCACAG GGCTAGCTACAACGA CCTGGACC	8279
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4298	UCAAUUGA G UGGCACUC	3491	GAGTGCCA GGCTAGCTACAACGA TCAATTGA	8288
4295	AUUGAGUG G CACUCAUC	3492	GATGAGTG GGCTAGCTACAACGA CACTCAAT	8289
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4284	CUCAUCAC A CAUUAUGA	3496	TCATAATG GGCTAGCTACAACGA GTGATGAG	8293
4282	CAUCACAC A UUAUGAUG	3497	CATCATAA GGCTAGCTACAACGA GTGTGATG	8294
4279	CACACAUU A UGAUGUCA	3498	TGACATCA GGCTAGCTACAACGA AATGTGTG	8295
4276	ACAUUAUG A UGUCAUAG	3499	CTATGACA GGCTAGCTACAACGA CATAATGT	8296
4274	AUUAUGAU G UCAUAGGC	3500	GCCTATGA GGCTAGCTACAACGA ATCATAAT	8297
4271	AUGAUGUC A UAGGCGCC	3501	GGCGCCTA GGCTAGCTACAACGA GACATCAT	8298
4267	UGUCAUAG G CGCCCCCA	3502	TGGGGGCG GGCTAGCTACAACGA CTATGACA	8299
4265	UCAUAGGC G CCCCCAGA	3503	TCTGGGGG GGCTAGCTACAACGA GCCTATGA	8300
4256	CCCCCAGA G CAACCACC	3504	GGTGGTTG GGCTAGCTACAACGA TCTGGGGG	8301
4253	CCAGAGCA A CCACCGUC	3505	GACGGTGG GGCTAGCTACAACGA TGCTCTGG	8302
4250	GAGCAACC A CCGUCGGC	3506	GCCGACGG GGCTAGCTACAACGA GGTTGCTC	8303
4247	CAACCACC G UCGGCAAG	3507	CTTGCCGA GGCTAGCTACAACGA GGTGGTTG	8304
4243	CACCGUCG G CAAGGAAC	3508	GTTCCTTG GGCTAGCTACAACGA CGACGGTG	8305
4236	GGCAAGGA A CUUGCCAU	3509	ATGGCAAG GGCTAGCTACAACGA TCCTTGCC	8306
4232	AGGAACUU G CCAUAGGU	3510	ACCTATGG GGCTAGCTACAACGA AAGTTCCT	8307
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4225	UGCCAUAG G UGGAGUAC	3512	GTACTCCA GGCTAGCTACAACGA CTATGGCA	8309
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4218	GGUGGAGU A CGUGAUGG	3514	CCATCACG GGCTAGCTACAACGA ACTCCACC	8311
4216	UGGAGUAC G UGAUGGGG	3515	CCCCATCA GGCTAGCTACAACGA GTACTCCA	8312
4213	AGUACGUG A UGGGGGCG	3516	CGCCCCCA GGCTAGCTACAACGA CACGTACT	8313
4207	UGAUGGGG G CGCCCGUG	3517	CACGGGCG GGCTAGCTACAACGA CCCCATCA	8314
4205	AUGGGGGC G CCCGUGGU	3518	ACCACGGG GGCTAGCTACAACGA GCCCCCAT	8315
4201	GGGCGCCC G UGGUGAUG	3519	CATCACCA GGCTAGCTACAACGA GGGCGCCC	8316
4198	CGCCCGUG G UGAUGGUC	3520	GACCATCA GGCTAGCTACAACGA CACGGGCG	8317
4195	CCGUGGUG A UGGUCCUU	3521	AAGGACCA GGCTAGCTACAACGA CACCACGG	8318
4192	UGGUGAUG G UCCUUACC	3522	GGTAAGGA GGCTAGCTACAACGA CATCACCA	8319
4186	UGGUCCUU A CCCCAGUU	3523	AACTGGGG GGCTAGCTACAACGA AAGGACCA	8320
4180	UUACCCCA G UUCUGAUG	3524	CATCAGAA GGCTAGCTACAACGA TGGGGTAA	8321
4174	CAGUUCUG A UGUUAGGA	3525	TCCTAACA GGCTAGCTACAACGA CAGAACTG	8322
4172	GUUCUGAU G UUAGGAUC	3526	GATCCTAA GGCTAGCTACAACGA ATCAGAAC	8323

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4160	GGAUCGAC A CCGUGUGC	3529	GCACACGG GGCTAGCTACAACGA GTCGATCC	8326
4157	UCGACACC G UGUGCCUU	3530	AAGGCACA GGCTAGCTACAACGA GGTGTCGA	8327
4155	GACACCGU G UGCCUUAG	3531	CTAAGGCA GGCTAGCTACAACGA ACGGTGTC	8328
4153	CACCGUGU G CCUUAGAC	3532	GTCTAAGG GGCTAGCTACAACGA ACACGGTG	8329
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4144	CCUUAGAC A UAUACGCC	3534	GGCGTATA GGCTAGCTACAACGA GTCTAAGG	8331
4142	UUAGACAU A UACGCCCC	3535	GGGGCGTA GGCTAGCTACAACGA ATGTCTAA	8332
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4138	ACAUAUAC G CCCCAAAC	3537	GTTTGGGG GGCTAGCTACAACGA GTATATGT	8334
4131	CGCCCCAA A CCCUAAGG	3538	CCTTAGGG GGCTAGCTACAACGA TTGGGGCG	8335
4123	ACCCUAAG G UGGCGGUA	3539	TACCGCCA GGCTAGCTACAACGA CTTAGGGT	8336
4120	CUAAGGUG G CGGUAACG	3540	CGTTACCG GGCTAGCTACAACGA CACCTTAG	8337
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4095	UAGGACGA G CACUUUGU	3546	ACAAAGTG GGCTAGCTACAACGA TCGTCCTA	8343
4093	GGACGAGC A CUUUGUAC	3547	GTACAAAG GGCTAGCTACAACGA GCTCGTCC	8344
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4086	CACUUUGU A CCCUUGGG	3549	CCCAAGGG GGCTAGCTACAACGA ACAAAGTG	8346
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4073	UGGGCUGC A UAUGCAGC	3552	GCTGCATA GGCTAGCTACAACGA GCAGCCCA	8349
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4026	GGGAGCGU G UAGGUGGG	3566	CCCACCTA GGCTAGCTACAACGA ACGCTCCC	8363
4022	GCGUGUAG G UGGGCCAC	3567	GTGGCCCA GGCTAGCTACAACGA CTACACGC	8364
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4015	GGUGGGCC A CUUGGAAU	3569	ATTCCAAG GGCTAGCTACAACGA GGCCCACC	8366
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3977	GACGAGUU G UCCGUGAA	3578	TTCACGGA GGCTAGCTACAACGA AACTCGTC	8375
3973	AGUUGUCC G UGAAGACC	3579	GGTCTTCA GGCTAGCTACAACGA GGACAACT	8376
3967	CCGUGAAG A CCGGGGAC	3580	GTCCCCGG GGCTAGCTACAACGA CTTCACGG	8377
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3957	CGGGGACC G CAUGGUAG	3582	CTACCATG GGCTAGCTACAACGA GGTCCCCG	8379
3955	GGGACCGC A UGGUAGUU	3583	AACTACCA GGCTAGCTACAACGA GCGGTCCC	8380

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3939	UUCCAUAG A CUCAACGG	3587	CCGTTGAG GGCTAGCTACAACGA CTATGGAA	8384
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3916	AGUCCACC G CCUUCGCA	3593	TGCGAAGG GGCTAGCTACAACGA GGTGGACT	8390
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3875	CGGAAGAU G CCCACAAC	3603	GTTGTGGG GGCTAGCTACAACGA ATCTTCCG	8400
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3798	GGGGGAUA G UAAGCUCC	3618	GGAGCTTA GGCTAGCTACAACGA TATCCCCC	8415
3794	GAUAGUAA G CUCCCCCU	3619	AGGGGGAG GGCTAGCTACAACGA TTACTATC	8416
3785	CUCCCCCU G CUGUCACC	3620	GGTGACAG GGCTAGCTACAACGA AGGGGGAG	8417
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3779	CUGCUGUC A CCCCGCCG	3622	CGGCGGGG GGCTAGCTACAACGA GACAGCAG	8419
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3757	CCGGAAUG A CAUCAGCG	3628	CGCTGATG GGCTAGCTACAACGA CATTCCGG	8425
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3751	UGACAUCA G CGUGUCUC	3630	GAGACACG GGCTAGCTACAACGA TGATGTCA	8427
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3747	AUCAGCGU G UCUCGUGA	3632	TCACGAGA GGCTAGCTACAACGA ACGCTGAT	8429
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3650	UGGUCUAC A UUGGUGUA	3656	TACACCAA GGCTAGCTACAACGA GTAGACCA	8453
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3573	AGUCCAGC A CACGCCGU	3675	ACGGCGTG GGCTAGCTACAACGA GCTGGACT	8472
3571	UCCAGCAC A CGCCGUUG	3676	CAACGGCG GGCTAGCTACAACGA GTGCTGGA	8473
3569	CAGCACAC G CCGUUGAC	3677	GTCAACGG GGCTAGCTACAACGA GTGTGCTG	8474
3566	CACACGCC G UUGACGCA	3678	TGCGTCAA GGCTAGCTACAACGA GGCGTGTG	8475
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3553	CGCAGGUC G CUAGGAAA	3682	TTTCCTAG GGCTAGCTACAACGA GACCTGCG	8479
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3540	GAAAGACU G CGUCGCGG	3684	CCGCGACG GGCTAGCTACAACGA AGTCTTTC	8481
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3535	ACUGCGUC G CGGUGGAA	3686	TTCCACCG GGCTAGCTACAACGA GACGCAGT	8483
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3500	UCGACUUG G UUCUUGUC	3692	GACAAGAA GGCTAGCTACAACGA CAAGTCGA	8489
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3488	UUGUCCCG G CCCGUGAG	3694	CTCACGGG GGCTAGCTACAACGA CGGGACAA	8491
3484	CCCGGCCC G UGAGGCUG	3695	CAGCCTCA GGCTAGCTACAACGA GGGCCGGG	8492
3479	CCCGUGAG G CUGGUGAU	3696	ATCACCAG GGCTAGCTACAACGA CTCACGGG	8493
3475	UGAGGCUG G UGAUAAUG	3697	CATTATCA GGCTAGCTACAACGA CAGCCTCA	8494

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3467	GUGAUAAU G CAGCCAAA	3700	TTTGGCTG GGCTAGCTACAACGA ATTATCAC	8497
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3437	UGUUGGGA G UAGGCCGU	3707	ACGGCCTA GGCTAGCTACAACGA TCCCAACA	8504
3433	GGGAGUAG G CCGUAAUG	3708	CATTACGG GGCTAGCTACAACGA CTACTCCC	8505
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3389	UCAAGACU G UCGGCUGG	3718	CCAGCCGA GGCTAGCTACAACGA AGTCTTGA	8515
3385	GACUGUCG G CUGGUCCU	3719	AGGACCAG GGCTAGCTACAACGA CGACAGTC	8516
3381	GUCGGCUG G UCCUAGGA	3720	TCCTAGGA GGCTAGCTACAACGA CAGCCGAC	8517
3372	UCCUAGGA G UAUCUCCC	3721	GGGAGATA GGCTAGCTACAACGA TCCTAGGA	8518
3370	CUAGGAGU A UCUCCCUC	3722	GAGGGAGA GGCTAGCTACAACGA ACTCCTAG	8519
3352	CCCUUCGG G CGGAGACA	3723	TGTCTCCG GGCTAGCTACAACGA CCGAAGGG	8520
3346	GGGCGGAG A CAGGUAGA	3724	TCTACCTG GGCTAGCTACAACGA CTCCGCCC	8521
3342	GGAGACAG G UAGACCCA	3725	TGGGTCTA GGCTAGCTACAACGA CTGTCTCC	8522
3338	ACAGGUAG A CCCAUAAU	3726	ATTATGGG GGCTAGCTACAACGA CTACCTGT	8523
3334	GUAGACCC A UAAUGAUG	3727	CATCATTA GGCTAGCTACAACGA GGGTCTAC	8524
3331	GACCCAUA A UGAUGUCC	3728	GGACATCA GGCTAGCTACAACGA TATGGGTC	8525
3328	CCAUAAUG A UGUCCCCA	3729	TGGGGACA GGCTAGCTACAACGA CATTATGG	8526
3326	AUAAUGAU G UCCCCACA	3730	TGTGGGGA GGCTAGCTACAACGA ATCATTAT	8527
3320	AUGUCCCC A CACGCCGC	3731	GCGGCGTG GGCTAGCTACAACGA GGGGACAT	8528
3318	GUCCCCAC A CGCCGCGG	3732	CCGCGGCG GGCTAGCTACAACGA GTGGGGAC	8529
3316	CCCCACAC G CCGCGGUG	3733	CACCGCGG GGCTAGCTACAACGA GTGTGGGG	8530
3313	CACACGCC G CGGUGUCU	3734	AGACACCG GGCTAGCTACAACGA GGCGTGTG	8531
3310	ACGCCGCG G UGUCUCCC	3735	GGGAGACA GGCTAGCTACAACGA CGCGGCGT	8532
3308	GCCGCGGU G UCUCCCCC	3736	GGGGGAGA GGCTAGCTACAACGA ACCGCGGC	8533
3295	CCCCCCAG G UGAUGAUC	3737	GATCATCA GGCTAGCTACAACGA CTGGGGGG	8534
3292	CCCAGGUG A UGAUCUUG	3738	CAAGATCA GGCTAGCTACAACGA CACCTGGG	8535
3289	AGGUGAUG A UCUUGAUU	3739	AATCAAGA GGCTAGCTACAACGA CATCACCT	8536
3283	UGAUCUUG A UUUCCAUG	3740	CATGGAAA GGCTAGCTACAACGA CAAGATCA	8537
3277	UGAUUUCC A UGUCGGAG	3741	CTCCGACA GGCTAGCTACAACGA GGAAATCA	8538
3275	AUUUCCAU G UCGGAGAA	3742	TTCTCCGA GGCTAGCTACAACGA ATGGAAAT	8539
3265	CGGAGAAG A CGACGGGC	3743	GCCCGTCG GGCTAGCTACAACGA CTTCTCCG	8540
3262	AGAAGACG A CGGGCUCG	3744	CGAGCCCG GGCTAGCTACAACGA CGTCTTCT	8541
3258	GACGACGG G CUCGACCG	3745	CGGTCGAG GGCTAGCTACAACGA CCGTCGTC	8542
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3250	GCUCGACC G CUACCGCC	3747	GGCGGTAG GGCTAGCTACAACGA GGTCGAGC	8544
3247	CGACCGCU A CCGCCAGG	3748	CCTGGCGG GGCTAGCTACAACGA AGCGGTCG	8545
3244	CCGCUACC G CCAGGUCU	3749	AGACCTGG GGCTAGCTACAACGA GGTAGCGG	8546
3239	ACCGCCAG G UCUCGUAG	3750	CTACGAGA GGCTAGCTACAACGA CTGGCGGT	8547
3234	CAGGUCUC G UAGACCUG	3751	CAGGTCTA GGCTAGCTACAACGA GAGACCTG	8548
3230	UCUCGUAG A CCUGUGUG	3752	CACACAGG GGCTAGCTACAACGA CTACGAGA	8549
3226	GUAGACCU G UGUGGGCC	3753	GGCCCACA GGCTAGCTACAACGA AGGTCTAC	8550
3224	AGACCUGU G UGGGCCCA	3754	TGGGCCCA GGCTAGCTACAACGA ACAGGTCT	8551

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3210	CCAGUCCU G CAGUGGAG	3757	CTCCACTG GGCTAGCTACAACGA AGGACTGG	8554
3207	GUCCUGCA G UGGAGUGA	3758	TCACTCCA GGCTAGCTACAACGA TGCAGGAC	8555
3202	GCAGUGGA G UGAGGUGG	3759	CCACCTCA GGCTAGCTACAACGA TCCACTGC	8556
3197	GGAGUGAG G UGGUCAUA	3760	TATGACCA GGCTAGCTACAACGA CTCACTCC	8557
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3183	AUAGACGG A CGUACCUU	3764	AAGGTACG GGCTAGCTACAACGA CCGTCTAT	8561
3181	AGACGGAC G UACCUUUC	3765	GAAAGGTA GGCTAGCTACAACGA GTCCGTCT	8562
3179	ACGGACGU A CCUUUCAA	3766	TTGAAAGG GGCTAGCTACAACGA ACGTCCGT	8563
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3148	UGAAGGCC A UUUGGACA	3772	TGTCCAAA GGCTAGCTACAACGA GGCCTTCA	8569
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3115	CUUUCCGC A CCAAAAUG	3780	CATTTTGG GGCTAGCTACAACGA GCGGAAAG	8577
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3107	ACCAAAAU G CAUUCACG	3782	CGTGAATG GGCTAGCTACAACGA ATTTTGGT	8579
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3085	CCCCUUGA G CCCGCACA	3787	TGTGCGGG GGCTAGCTACAACGA TCAAGGGG	8584
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3079	GAGCCCGC A CAAAGUCC	3789	GGACTTTG GGCTAGCTACAACGA GCGGGCTC	8586
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3058	CUUUUGCU A UACCAGCC	3794	GGCTGGTA GGCTAGCTACAACGA AGCAAAAG	8591
3056	UUUGCUAU A CCAGCCUG	3795	CAGGCTGG GGCTAGCTACAACGA ATAGCAAA	8592
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3043	CCUGGAGC A CCAUGAGC	3798	GCTCATGG GGCTAGCTACAACGA GCTCCAGG	8595
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3013	CGAGCAUA A UUUUGGUG	3807	CACCAAAA GGCTAGCTACAACGA TATGCTCG	8604
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2980	CUGGGUGG A CCACACAC	3814	GTGTGTGG GGCTAGCTACAACGA CCACCCAG	8611
2977	GGUGGACC A CACACGUG	3815	CACGTGTG GGCTAGCTACAACGA GGTCCACC	8612
2975	UGGACCAC A CACGUGAG	3816	CTCACGTG GGCTAGCTACAACGA GTGGTCCA	8613
2973	GACCACAC A CGUGAGGA	3817	TCCTCACG GGCTAGCTACAACGA GTGTGGTC	8614
2971	CCACACAC G UGAGGAGA	3818	TCTCCTCA GGCTAGCTACAACGA GTGTGTGG	8615
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2954	AUGAUGGC A CCGCGCCC	3822	GGGCGCGG GGCTAGCTACAACGA GCCATCAT	8619
2951	AUGGCACC G CGCCCCCC	3823	GGGGGGCG GGCTAGCTACAACGA GGTGCCAT	8620
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2938	CCCCCCGA A CGUUGAGG	3825	CCTCAACG GGCTAGCTACAACGA TCGGGGGG	8622
2936	CCCCGAAC G UUGAGGGG	3826	CCCCTCAA GGCTAGCTACAACGA GTTCGGGG	8623
2923	GGGGGGGG A UCCACACU	3827	AGTGTGGA GGCTAGCTACAACGA CCCCCCCC	8624
2919	GGGGAUCC A CACUUGCA	3828	TGCAAGTG GGCTAGCTACAACGA GGATCCCC	8625
2917	GGAUCCAC A CUUGCAAC	3829	GTTGCAAG GGCTAGCTACAACGA GTGGATCC	8626
2913	CCACACUU G CAACUGCG	3830	CGCAGTTG GGCTAGCTACAACGA AAGTGTGG	8627
2910	CACUUGCA A CUGCGCCU	3831	AGGCGCAG GGCTAGCTACAACGA TGCAAGTG	8628
2907	UUGCAACU G CGCCUCGG	3832	CCGAGGCG GGCTAGCTACAACGA AGTTGCAA	8629
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2487	AUACUCCC A UUUGAUUG	3940	CAATCAAA GGCTAGCTACAACGA GGGAGTAT	8737
2482	CCCAUUUG A UUGCGAAG	3941	CTTCGCAA GGCTAGCTACAACGA CAAATGGG	8738
2479	AUUUGAUU G CGAAGGAG	3942	CTCCTTCG GGCTAGCTACAACGA AATCAAAT	8739
2470	CGAAGGAG A CAACCGCU	3943	AGCGGTTG GGCTAGCTACAACGA CTCCTTCG	8740
2467	AGGAGACA A CCGCUGAC	3944	GTCAGCGG GGCTAGCTACAACGA TGTCTCCT	8741
2464	AGACAACC G CUGACCCU	3945	AGGGTCAG GGCTAGCTACAACGA GGTTGTCT	8742
2460	AACCGCUG A CCCUACAC	3946	GTGTAGGG GGCTAGCTACAACGA CAGCGGTT	8743
2455	CUGACCCU A CACCGUAC	3947	GTACGGTG GGCTAGCTACAACGA AGGGTCAG	8744
2453	GACCCUAC A CCGUACAG	3948	CTGTACGG GGCTAGCTACAACGA GTAGGGTC	8745
2450	CCUACACC G UACAGGUA	3949	TACCTGTA GGCTAGCTACAACGA GGTGTAGG	8746
2448	UACACCGU A CAGGUAUU	3950	AATACCTG GGCTAGCTACAACGA ACGGTGTA	8747
2444	CCGUACAG G UAUUGCAC	3951	GTGCAATA GGCTAGCTACAACGA CTGTACGG	8748
2442	GUACAGGU A UUGCACGU	3952	ACGTGCAA GGCTAGCTACAACGA ACCTGTAC	8749
2439	CAGGUAUU G CACGUCCA	3953	TGGACGTG GGCTAGCTACAACGA AATACCTG	8750
2437	GGUAUUGC A CGUCCACG	3954	CGTGGACG GGCTAGCTACAACGA GCAATACC	8751
2435	UAUUGCAC G UCCACGAU	3955	ATCGTGGA GGCTAGCTACAACGA GTGCAATA	8752
2431	GCACGUCC A CGAUGUUC	3956	GAACATCG GGCTAGCTACAACGA GGACGTGC	8753
2428	CGUCCACG A UGUUCUGG	3957	CCAGAACA GGCTAGCTACAACGA CGTGGACG	8754
2426	UCCACGAU G UUCUGGUG	3958	CACCAGAA GGCTAGCTACAACGA ATCGTGGA	8755
2420	AUGUUCUG G UGGAGAUG	3959	CATCTCCA GGCTAGCTACAACGA CAGAACAT	8756
2414	UGGUGGAG A UGGAUCAA	3960	TTGATCCA GGCTAGCTACAACGA CTCCACCA	8757
2410	GGAGAUGG A UCAAACCA	3961	TGGTTTGA GGCTAGCTACAACGA CCATCTCC	8758
2405	UGGAUCAA A CCAGUGGA	3962	TCCACTGG GGCTAGCTACAACGA TTGATCCA	8759
2401	UCAAACCA G UGGACAGA	3963	TCTGTCCA GGCTAGCTACAACGA TGGTTTGA	8760
2397	ACCAGUGG A CAGAGCCG	3964	CGGCTCTG GGCTAGCTACAACGA CCACTGGT	8761
2392	UGGACAGA G CCGGUAGG	3965	CCTACCGG GGCTAGCTACAACGA TCTGTCCA	8762
2388	CAGAGCCG G UAGGGUGG	3966	CCACCCTA GGCTAGCTACAACGA CGGCTCTG	8763
2383	CCGGUAGG G UGGUGAAG	3967	CTTCACCA GGCTAGCTACAACGA CCTACCGG	8764
2380	GUAGGGUG G UGAAGGAG	3968	CTCCTTCA GGCTAGCTACAACGA CACCCTAC	8765
2372	GUGAAGGA G CAGGGCAG	3969	CTGCCCTG GGCTAGCTACAACGA TCCTTCAC	8766
2367	GGAGCAGG G CAGUAUUU	3970	AAATACTG GGCTAGCTACAACGA CCTGCTCC	8767
2364	GCAGGGCA G UAUUUGCC	3971	GGCAAATA GGCTAGCTACAACGA TGCCCTGC	8768
2362	AGGGCAGU A UUUGCCAC	3972	GTGGCAAA GGCTAGCTACAACGA ACTGCCCT	8769
2358	CAGUAUUU G CCACUCUG	3973	CAGAGTGG GGCTAGCTACAACGA AAATACTG	8770
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2350	GCCACUCU G UAGUGGAC	3975	GTCCACTA GGCTAGCTACAACGA AGAGTGGC	8772
2347	ACUCUGUA G UGGACAAC	3976	GTTGTCCA GGCTAGCTACAACGA TACAGAGT	8773
2343	UGUAGUGG A CAACAGCA	3977	TGCTGTTG GGCTAGCTACAACGA CCACTACA	8774
2340	AGUGGACA A CAGCAGCG	3978	CGCTGCTG GGCTAGCTACAACGA TGTCCACT	8775
2337	GGACAACA G CAGCGGGC	3979	GCCCGCTG GGCTAGCTACAACGA TGTTGTCC	8776
2334	CAACAGCA G CGGGCUGA	3980	TCAGCCCG GGCTAGCTACAACGA TGCTGTTG	8777
2330	AGCAGCGG G CUGAGCUC	3981	GAGCTCAG GGCTAGCTACAACGA CCGCTGCT	8778
2325	CGGGCUGA G CUCUGAUC	3982	GATCAGAG GGCTAGCTACAACGA TCAGCCCG	8779

2319	GAGCUCUG A UCUGUCCC	3983	GGGACAGA GGCTAGCTACAACGA CAGAGCTC	8780
2315	UCUGAUCU G UCCCUGUC	3984	GACAGGGA GGCTAGCTACAACGA AGATCAGA	8781
2309	CUGUCCCU G UCCUCCAA	3985	TTGGAGGA GGCTAGCTACAACGA AGGGACAG	8782
2300	UCCUCCAA A UCACAACG	3986	CGTTGTGA GGCTAGCTACAACGA TTGGAGGA	8783
2297	UCCAAAUC A CAACGCUC	3987	GAGCGTTG GGCTAGCTACAACGA GATTTGGA	8784
2294	AAAUCACA A CGCUCUCC	3988	GGAGAGCG GGCTAGCTACAACGA TGTGATTT	8785
2292	AUCACAAC G CUCUCCUC	3989	GAGGAGAG GGCTAGCTACAACGA GTTGTGAT	8786
2281	CUCCUCGA G UCCAAUUG	3990	CAATTGGA GGCTAGCTACAACGA TCGAGGAG	8787
2276	CGAGUCCA A UUGCAUGC	3991	GCATGCAA GGCTAGCTACAACGA TGGACTCG	8788
2273	GUCCAAUU G CAUGCGGC	3992	GCCGCATG GGCTAGCTACAACGA AATTGGAC	8789
2271	CCAAUUGC A UGCGGCGG	3993	CCGCCGCA GGCTAGCTACAACGA GCAATTGG	8790
2269	AAUUGCAU G CGGCGGUG	3994	CACCGCCG GGCTAGCTACAACGA ATGCAATT	8791
2266	UGCAUGCG G CGGUGAGC	3995	GCTCACCG GGCTAGCTACAACGA CGCATGCA	8792
2263	AUGCGGCG G UGAGCCUG	3996	CAGGCTCA GGCTAGCTACAACGA CGCCGCAT	8793
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2255	GUGAGCCU G UGCUCCAC	3998	GTGGAGCA GGCTAGCTACAACGA AGGCTCAC	8795
2253	GAGCCUGU G CUCCACGC	3999	GCGTGGAG GGCTAGCTACAACGA ACAGGCTC	8796
2248	UGUGCUCC A CGCCCCCC	4000	GGGGGGCG GGCTAGCTACAACGA GGAGCACA	8797
2246	UGCUCCAC G CCCCCCAC	4001	GTGGGGGG GGCTAGCTACAACGA GTGGAGCA	8798
2239	CGCCCCCC A CAUACAUC	4002	GATGTATG GGCTAGCTACAACGA GGGGGGCG	8799
2237	CCCCCCAC A UACAUCCU	4003	AGGATGTA GGCTAGCTACAACGA GTGGGGGG	8800
2235	CCCCACAU A CAUCCUAA	4004	TTAGGATG GGCTAGCTACAACGA ATGTGGGG	8801
2233	CCACAUAC A UCCUAACC	4005	GGTTAGGA GGCTAGCTACAACGA GTATGTGG	8802
2227	ACAUCCUA A CCUUAAAG	4006	CTTTAAGG GGCTAGCTACAACGA TAGGATGT	8803
2218	CCUUAAAG A UGGAAAAA	4007	TTTTTCCA GGCTAGCTACAACGA CTTTAAGG	8804
2210	AUGGAAAA A UUGACAGU	4008	ACTGTCAA GGCTAGCTACAACGA TTTTCCAT	8805
2206	AAAAAUUG A CAGUGCAG	4009	CTGCACTG GGCTAGCTACAACGA CAATTTTT	8806
2203	AAUUGACA G UGCAGGGG	4010	CCCCTGCA GGCTAGCTACAACGA TGTCAATT	8807
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2195	GUGCAGGG G UAGUGCCA	4012	TGGCACTA GGCTAGCTACAACGA CCCTGCAC	8809
2192	CAGGGGUA G UGCCAAAG	4013	CTTTGGCA GGCTAGCTACAACGA TACCCCTG	8810
2190	GGGGUAGU G CCAAAGCC	4014	GGCTTTGG GGCTAGCTACAACGA ACTACCCC	8811
2184	GUGCCAAA G CCUGUAUG	4015	CATACAGG GGCTAGCTACAACGA TTTGGCAC	8812
2180	CAAAGCCU G UAUGGGUA	4016	TACCCATA GGCTAGCTACAACGA AGGCTTTG	8813
2178	AAGCCUGU A UGGGUAGU	4017	ACTACCCA GGCTAGCTACAACGA ACAGGCTT	8814
2174	CUGUAUGG G UAGUCAAC	4018	GTTGACTA GGCTAGCTACAACGA CCATACAG	8815
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2167	GGUAGUCA A CUAUGCAU	4020	ATGCATAG GGCTAGCTACAACGA TGACTACC	8817
2164	AGUCAACU A UGCAUCUA	4021	TAGATGCA GGCTAGCTACAACGA AGTTGACT	8818
2162	UCAACUAU G CAUCUAGG	4022	CCTAGATG GGCTAGCTACAACGA ATAGTTGA	8819
2160	AACUAUGC A UCUAGGUG	4023	CACCTAGA GGCTAGCTACAACGA GCATAGTT	8820
2154	GCAUCUAG G UGUUAACC	4024	GGTTAACA GGCTAGCTACAACGA CTAGATGC	8821
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2135	GGCCCCGA A CCGCACUU	4028	AAGTGCGG GGCTAGCTACAACGA TCGGGGCC	8825
2132	CCCGAACC G CACUUUGC	4029	GCAAAGTG GGCTAGCTACAACGA GGTTCGGG	8826
2130	CGAACCGC A CUUUGCGU	4030	ACGCAAAG GGCTAGCTACAACGA GCGGTTCG	8827
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2123	CACUUUGC G UAAGUGGC	4032	GCCACTTA GGCTAGCTACAACGA GCAAAGTG	8829
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2106	CUCGGGGU G CUUCCGGA	4036	TCCGGAAG GGCTAGCTACAACGA ACCCCGAG	8833
2096	UUCCGGAA G CAGUCCGU	4037	ACGGACTG GGCTAGCTACAACGA TTCCGGAA	8834
2093	CGGAAGCA G UCCGUGGG	4038	CCCACGGA GGCTAGCTACAACGA TGCTTCCG	8835
2089	AGCAGUCC G UGGGGCAG	4039	CTGCCCCA GGCTAGCTACAACGA GGACTGCT	8836

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2074	AGGUUAAG G UGUCGUUA	4042	TAACGACA GGCTAGCTACAACGA CTTAACCT	8839
2072	GUUAAGGU G UCGUUACC	4043	GGTAACGA GGCTAGCTACAACGA ACCTTAAC	8840
2069	AAGGUGUC G UUACCGGC	4044	GCCGGTAA GGCTAGCTACAACGA GACACCTT	8841
2066	GUGUCGUU A CCGGCCCC	4045	GGGGCCGG GGCTAGCTACAACGA AACGACAC	8842
2062	CGUUACCG G CCCCCCCG	4046	CGGGGGGG GGCTAGCTACAACGA CGGTAACG	8843
2053	CCCCCCCG A UGUUGCAC	4047	GTGCAACA GGCTAGCTACAACGA CGGGGGGG	8844
2051	CCCCCGAU G UUGCACGG	4048	CCGTGCAA GGCTAGCTACAACGA ATCGGGGG	8845
2048	CCGAUGUU G CACGGGGG	4049	CCCCCGTG GGCTAGCTACAACGA AACATCGG	8846
2046	GAUGUUGC A CGGGGGGC	4050	GCCCCCCG GGCTAGCTACAACGA GCAACATC	8847
2039	CACGGGGG G CCCCCGCA	4051	TGCGGGGG GGCTAGCTACAACGA CCCCCGTG	8848
2033	GGGCCCCC G CACGUCUU	4052	AAGACGTG GGCTAGCTACAACGA GGGGGCCC	8849
2031	GCCCCCGC A CGUCUUGG	4053	CCAAGACG GGCTAGCTACAACGA GCGGGGGC	8850
2029	CCCCGCAC G UCUUGGUG	4054	CACCAAGA GGCTAGCTACAACGA GTGCGGGG	8851
2023	ACGUCUUG G UGAACCCA	4055	TGGGTTCA GGCTAGCTACAACGA CAAGACGT	8852
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2014	UGAACCCA G UGCCAUUC	4057	GAATGGCA GGCTAGCTACAACGA TGGGTTCA	8854
2012	AACCCAGU G CCAUUCAU	4058	ATGAATGG GGCTAGCTACAACGA ACTGGGTT	8855
2009	CCAGUGCC A UUCAUCCA	4059	TGGATGAA GGCTAGCTACAACGA GGCACTGG	8856
2005	UGCCAUUC A UCCAUGUG	4060	CACATGGA GGCTAGCTACAACGA GAATGGCA	8857
2001	AUUCAUCC A UGUGCAGC	4061	GCTGCACA GGCTAGCTACAACGA GGATGAAT	8858
1999	UCAUCCAU G UGCAGCCG	4062	CGGCTGCA GGCTAGCTACAACGA ATGGATGA	8859
1997	AUCCAUGU G CAGCCGAA	4063	TTCGGCTG GGCTAGCTACAACGA ACATGGAT	8860
1994	CAUGUGCA G CCGAACCA	4064	TGGTTCGG GGCTAGCTACAACGA TGCACATG	8861
1989	GCAGCCGA A CCAGUUGC	4065	GCAACTGG GGCTAGCTACAACGA TCGGCTGC	8862
1985	CCGAACCA G UUGCCUUG	4066	CAAGGCAA GGCTAGCTACAACGA TGGTTCGG	8863
1982	AACCAGUU G CCUUGCGG	4067	CCGCAAGG GGCTAGCTACAACGA AACTGGTT	8864
1977	GUUGCCUU G CGGCGGCC	4068	GGCCGCCG GGCTAGCTACAACGA AAGGCAAC	8865
1974	GCCUUGCG G CGGCCGCG	4069	CGCGGCCG GGCTAGCTACAACGA CGCAAGGC	8866
1971	UUGCGGCG G CCGCGUGU	4070	ACACGCGG GGCTAGCTACAACGA CGCCGCAA	8867
1968	CGGCGGCC G CGUGUUGU	4071	ACAACACG GGCTAGCTACAACGA GGCCGCCG	8868
1966	GCGGCCGC G UGUUGUUG	4072	CAACAACA GGCTAGCTACAACGA GCGGCCGC	8869
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1961	CGCGUGUU G UUGAGGAG	4074	CTCCTCAA GGCTAGCTACAACGA AACACGCG	8871
1953	GUUGAGGA G CAGCACGU	4075	ACGTGCTG GGCTAGCTACAACGA TCCTCAAC	8872
1950	GAGGAGCA G CACGUCCG	4076	CGGACGTG GGCTAGCTACAACGA TGCTCCTC	8873
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1946	AGCAGCAC G UCCGUCUC	4078	GAGACGGA GGCTAGCTACAACGA GTGCTGCT	8875
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1922	CCCCAGUU A UACGUGGG	4083	CCCACGTA GGCTAGCTACAACGA AACTGGGG	8880
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1865	GGGGUGAA G CAAUACAC	4097	GTGTATTG GGCTAGCTACAACGA TTCACCCC	8894
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1860	GAAGCAAU A CACUGGAC	4099	GTCCAGTG GGCTAGCTACAACGA ATTGCTTC	8896
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1823	ACGAUACC A CACGGCCG	4112	CGGCCGTG GGCTAGCTACAACGA GGTATCGT	8909
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1808	CGCGGUGC G UAGUGCCA	4118	TGGCACTA GGCTAGCTACAACGA GCACCGCG	8915
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1746	AGGACCCC A CCCCUGAG	4133	CTCAGGGG GGCTAGCTACAACGA GGGGTCCT	8930
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1721	UCAAUGGA G CGGCAGCU	4138	AGCTGCCG GGCTAGCTACAACGA TCCATTGA	8935
1718	AUGGAGCG G CAGCUGGC	4139	GCCAGCTG GGCTAGCTACAACGA CGCTCCAT	8936
1715	GAGCGGCA G CUGGCCAA	4140	TTGGCCAG GGCTAGCTACAACGA TGCCGCTC	8937
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1672	ACCUGUGU G CAUAGAAC	4152	GTTCTATG GGCTAGCTACAACGA ACACAGGT	8949
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1662	AUAGAACA G UGCAGCAA	4155	TTGCTGCA GGCTAGCTACAACGA TGTTCTAT	8952
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1657	ACAGUGCA G CAAUGAAC	4157	GTTCATTG GGCTAGCTACAACGA TGCACTGT	8954
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1631	AGGGAGUC A UUGCAGUU	4162	AACTGCAA GGCTAGCTACAACGA GACTCCCT	8959
1628	GAGUCAUU G CAGUUCAG	4163	CTGAACTG GGCTAGCTACAACGA AATGACTC	8960
1625	UCAUUGCA G UUCAGGGC	4164	GCCCTGAA GGCTAGCTACAACGA TGCAATGA	8961
1618	AGUUCAGG G CAGUCCUG	4165	CAGGACTG GGCTAGCTACAACGA CCTGAACT	8962
1615	UCAGGGCA G UCCUGUUA	4166	TAACAGGA GGCTAGCTACAACGA TGCCCTGA	8963
1610	GCAGUCCU G UUAAUGUG	4167	CACATTAA GGCTAGCTACAACGA AGGACTGC	8964
1606	UCCUGUUA A UGUGCCAG	4168	CTGGCACA GGCTAGCTACAACGA TAACAGGA	8965
1604	CUGUUAAU G UGCCAGCU	4169	AGCTGGCA GGCTAGCTACAACGA ATTAACAG	8966
1602	GUUAAUGU G CCAGCUGC	4170	GCAGCTGG GGCTAGCTACAACGA ACATTAAC	8967
1598	AUGUGCCA G CUGCCGUU	4171	AACGGCAG GGCTAGCTACAACGA TGGCACAT	8968
1595	UGCCAGCU G CCGUUGGU	4172	ACCAACGG GGCTAGCTACAACGA AGCTGGCA	8969
1592	CAGCUGCC G UUGGUGUU	4173	AACACCAA GGCTAGCTACAACGA GGCAGCTG	8970
1588	UGCCGUUG G UGUUAAUA	4174	TATTAACA GGCTAGCTACAACGA CAACGGCA	8971
1586	CCGUUGGU G UUAAUAAG	4175	CTTATTAA GGCTAGCTACAACGA ACCAACGG	8972
1582	UGGUGUUA A UAAGCUGG	4176	CCAGCTTA GGCTAGCTACAACGA TAACACCA	8973
1578	GUUAAUAA G CUGGAUAU	4177	ATATCCAG GGCTAGCTACAACGA TTATTAAC	8974
1573	UAAGCUGG A UAUUCUGA	4178	TCAGAATA GGCTAGCTACAACGA CCAGCTTA	8975
1571	AGCUGGAU A UUCUGAGA	4179	TCTCAGAA GGCTAGCTACAACGA ATCCAGCT	8976
1563	AUUCUGAG A UGCUCCAG	4180	CTGGAGCA GGCTAGCTACAACGA CTCAGAAT	8977
1561	UCUGAGAU G CUCCAGAU	4181	ATCTGGAG GGCTAGCTACAACGA ATCTCAGA	8978
1554	UGCUCCAG A UGUAAAGA	4182	TCTTTACA GGCTAGCTACAACGA CTGGAGCA	8979
1552	CUCCAGAU G UAAAGAGG	4183	CCTCTTTA GGCTAGCTACAACGA ATCTGGAG	8980
1542	AAAGAGGG A UGCCACCC	4184	GGGTGGCA GGCTAGCTACAACGA CCCTCTTT	8981
1540	AGAGGGAU G CCACCCUA	4185	TAGGGTGG GGCTAGCTACAACGA ATCCCTCT	8982
1537	GGGAUGCC A CCCUACUA	4186	TAGTAGGG GGCTAGCTACAACGA GGCATCCC	8983
1532	GCCACCCU A CUAGUGGU	4187	ACCACTAG GGCTAGCTACAACGA AGGGTGGC	8984
1528	CCCUACUA G UGGUGUGG	4188	CCACACCA GGCTAGCTACAACGA TAGTAGGG	8985
1525	UACUAGUG G UGUGGCCC	4189	GGGCCACA GGCTAGCTACAACGA CACTAGTA	8986
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1515	GUGGCCCU G CGCCCCCC	4192	GGGGGGCG GGCTAGCTACAACGA AGGGCCAC	8989
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1487	GUGUCCCC G UCAACGCC	4199	GGCGTTGA GGCTAGCTACAACGA GGGGACAC	8996
1483	CCCCGUCA A CGCCGGCA	4200	TGCCGGCG GGCTAGCTACAACGA TGACGGGG	8997
1481	CCGUCAAC G CCGGCAAA	4201	TTTGCCGG GGCTAGCTACAACGA GTTGACGG	8998
1477	CAACGCCG G CAAAGAGU	4202	ACTCTTTG GGCTAGCTACAACGA CGGCGTTG	8999
1470	GGCAAAGA G UAGCAUCA	4203	TGATGCTA GGCTAGCTACAACGA TCTTTGCC	9000
1467	AAAGAGUA G CAUCACAA	4204	TTGTGATG GGCTAGCTACAACGA TACTCTTT	9001
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1462	GUAGCAUC A CAAUCAAC	4206	GTTGATTG GGCTAGCTACAACGA GATGCTAC	9003
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1455	CACAAUCA A CACCUUAG	4208	CTAAGGTG GGCTAGCTACAACGA TGATTGTG	9005
1453	CAAUCAAC A CCUUAGCC	4209	GGCTAAGG GGCTAGCTACAACGA GTTGATTG	9006
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1435	AGUUCCCC A CCAUGGAA	4212	TTCCATGG GGCTAGCTACAACGA GGGGAACT	9009
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756	GCCGACGA G CGGAAUGU	4383	ACATTCCG GGCTAGCTACAACGA TCGTCGGC	9180
751	CGAGCGGA A UGUACCCC	4384	GGGGTACA GGCTAGCTACAACGA TCCGCTCG	9181
749	AGCGGAAU G UACCCCAU	4385	ATGGGGTA GGCTAGCTACAACGA ATTCCGCT	9182
747	CGGAAUGU A CCCCAUGA	4386	TCATGGGG GGCTAGCTACAACGA ACATTCCG	9183
742	UGUACCCC A UGAGGUCG	4387	CGACCTCA GGCTAGCTACAACGA GGGGTACA	9184
737	CCCAUGAG G UCGGCGAA	4388	TTCGCCGA GGCTAGCTACAACGA CTCATGGG	9185
733	UGAGGUCG G CGAAGCCG	4389	CGGCTTCG GGCTAGCTACAACGA CGACCTCA	9186
728	UCGGCGAA G CCGCAUGU	4390	ACATGCGG GGCTAGCTACAACGA TTCGCCGA	9187
725	GCGAAGCC G CAUGUGAG	4391	CTCACATG GGCTAGCTACAACGA GGCTTCGC	9188
723	GAAGCCGC A UGUGAGGG	4392	CCCTCACA GGCTAGCTACAACGA GCGGCTTC	9189
721	AGCCGCAU G UGAGGGUA	4393	TACCCTCA GGCTAGCTACAACGA ATGCGGCT	9190
715	AUGUGAGG G UAUCGAUG	4394	CATCGATA GGCTAGCTACAACGA CCTCACAT	9191
713	GUGAGGGU A UCGAUGAC	4395	GTCATCGA GGCTAGCTACAACGA ACCCTCAC	9192
709	GGGUAUCG A UGACCUUA	4396	TAAGGTCA GGCTAGCTACAACGA CGATACCC	9193
706	UAUCGAUG A CCUUACCC	4397	GGGTAAGG GGCTAGCTACAACGA CATCGATA	9194
701	AUGACCUU A CCCAAGUU	4398	AACTTGGG GGCTAGCTACAACGA AAGGTCAT	9195
695	UUACCCAA G UUACGCGA	4399	TCGCGTAA GGCTAGCTACAACGA TTGGGTAA	9196
692	CCCAAGUU A CGCGACCU	4400	AGGTCGCG GGCTAGCTACAACGA AACTTGGG	9197
690	CAAGUUAC G CGACCUAC	4401	GTAGGTCG GGCTAGCTACAACGA GTAACTTG	9198
687	GUUACGCG A CCUACGCC	4402	GGCGTAGG GGCTAGCTACAACGA CGCGTAAC	9199
683	CGCGACCU A CGCCGGGG	4403	CCCCGGCG GGCTAGCTACAACGA AGGTCGCG	9200
681	CGACCUAC G CCGGGGGU	4404	ACCCCCGG GGCTAGCTACAACGA GTAGGTCG	9201
674	CGCCGGGG G UCCGUGGG	4405	CCCACGGA GGCTAGCTACAACGA CCCCGGCG	9202
670	GGGGGUCC G UGGGGCCC	4406	GGGCCCCA GGCTAGCTACAACGA GGACCCCC	9203
665	UCCGUGGG G CCCCAACU	4407	AGTTGGGG GGCTAGCTACAACGA CCCACGGA	9204
659	GGGCCCCA A CUAGGCCG	4408	CGGCCTAG GGCTAGCTACAACGA TGGGGCCC	9205
654	CCAACUAG G CCGGGAGC	4409	GCTCCCGG GGCTAGCTACAACGA CTAGTTGG	9206
647	GGCCGGGA G CCGCGGGG	4410	CCCCGCGG GGCTAGCTACAACGA TCCCGGCC	9207
644	CGGGAGCC G CGGGGUGA	4411	TCACCCCG GGCTAGCTACAACGA GGCTCCCG	9208
639	GCCGCGGG G UGACAGGA	4412	TCCTGTCA GGCTAGCTACAACGA CCCGCGGC	9209
636	GCGGGGUG A CAGGAGCC	4413	GGCTCCTG GGCTAGCTACAACGA CACCCCGC	9210
630	UGACAGGA G CCAUCCUG	4414	CAGGATGG GGCTAGCTACAACGA TCCTGTCA	9211
627	CAGGAGCC A UCCUGCCC	4415	GGGCAGGA GGCTAGCTACAACGA GGCTCCTG	9212
622	GCCAUCCU G CCCACCCU	4416	AGGGTGGG GGCTAGCTACAACGA AGGATGGC	9213
618	UCCUGCCC A CCCUAAGC	4417	GCTTAGGG GGCTAGCTACAACGA GGGCAGGA	9214
611	CACCCUAA G CCCUCAUU	4418	AATGAGGG GGCTAGCTACAACGA TTAGGGTG	9215
605	AAGCCCUC A UUGCCAUA	4419	TATGGCAA GGCTAGCTACAACGA GAGGGCTT	9216
602	CCCUCAUU G CCAUAGAG	4420	CTCTATGG GGCTAGCTACAACGA AATGAGGG	9217
599	UCAUUGCC A UAGAGGGG	4421	CCCCTCTA GGCTAGCTACAACGA GGCAATGA	9218
591	AUAGAGGG G CCAAGGGU	4422	ACCCTTGG GGCTAGCTACAACGA CCCTCTAT	9219
584	GGCCAAGG G UACCCGGG	4423	CCCGGGTA GGCTAGCTACAACGA CCTTGGCC	9220
582	CCAAGGGU A CCCGGGCU	4424	AGCCCGGG GGCTAGCTACAACGA ACCCTTGG	9221
576	GUACCCGG G CUGAGCCC	4425	GGGCTCAG GGCTAGCTACAACGA CCGGGTAC	9222
571	CGGGCUGA G CCCAGGCC	4426	GGCCTGGG GGCTAGCTACAACGA TCAGCCCG	9223
565	GAGCCCAG G CCCUGCCC	4427	GGGCAGGG GGCTAGCTACAACGA CTGGGCTC	9224
560	CAGGCCCU G CCCUCGGG	4428	CCCGAGGG GGCTAGCTACAACGA AGGGCCTG	9225
552	GCCCUCGG G CCGGCGAG	4429	CTCGCCGG GGCTAGCTACAACGA CCGAGGGC	9226
548	UCGGGCCG G CGAGCCUU	4430	AAGGCTCG GGCTAGCTACAACGA CGGCCCGA	9227
544	GCCGGCGA G CCUUGGGG	4431	CCCCAAGG GGCTAGCTACAACGA TCGCCGGC	9228
535	CCUUGGGG A UAGGUUGU	4432	ACAACCTA GGCTAGCTACAACGA CCCCAAGG	9229
531	GGGGAUAG G UUGUCGCC	4433	GGCGACAA GGCTAGCTACAACGA CTATCCCC	9230
528	GAUAGGUU G UCGCCUUC	4434	GAAGGCGA GGCTAGCTACAACGA AACCTATC	9231
525	AGGUUGUC G CCUUCCAC	4435	GTGGAAGG GGCTAGCTACAACGA GACAACCT	9232
518	CGCCUUCC A CGAGGUUG	4436	CAACCTCG GGCTAGCTACAACGA GGAAGGCG	9233
513	UCCACGAG G UUGCGACC	4437	GGTCGCAA GGCTAGCTACAACGA CTCGTGGA	9234
510	ACGAGGUU G CGACCGCU	4438	AGCGGTCG GGCTAGCTACAACGA AACCTCGT	9235

507	AGGUUGCG A CCGCUCGG	4439	CCGAGCGG GGCTAGCTACAACGA CGCAACCT	9236
504	UUGCGACC G CUCGGAAG	4440	CTTCCGAG GGCTAGCTACAACGA GGTCGCAA	9237
496	GCUCGGAA G UCUUCCUA	4441	TAGGAAGA GGCTAGCTACAACGA TTCCGAGC	9238
487	UCUUCCUA G UCGCGCGC	4442	GCGCGCGA GGCTAGCTACAACGA TAGGAAGA	9239
484	UCCUAGUC G CGCGCACA	4443	TGTGCGCG GGCTAGCTACAACGA GACTAGGA	9240
482	CUAGUCGC G CGCACACC	4444	GGTGTGCG GGCTAGCTACAACGA GCGACTAG	9241
480	AGUCGCGC G CACACCCA	4445	TGGGTGTG GGCTAGCTACAACGA GCGCGACT	9242
478	UCGCGCGC A CACCCAAC	4446	GTTGGGTG GGCTAGCTACAACGA GCGCGCGA	9243
476	GCGCGCAC A CCCAACCU	4447	AGGTTGGG GGCTAGCTACAACGA GTGCGCGC	9244
471	CACACCCA A CCUGGGGC	4448	GCCCCAGG GGCTAGCTACAACGA TGGGTGTG	9245
464	AACCUGGG G CCCCUGCG	4449	CGCAGGGG GGCTAGCTACAACGA CCCAGGTT	9246
458	GGGCCCCU G CGCGGCAA	4450	TTGCCGCG GGCTAGCTACAACGA AGGGGCCC	9247
456	GCCCCUGC G CGGCAACA	4451	TGTTGCCG GGCTAGCTACAACGA GCAGGGGC	9248
453	CCUGCGCG G CAACAGGU	4452	ACCTGTTG GGCTAGCTACAACGA CGCGCAGG	9249
450	GCGCGGCA A CAGGUAAA	4453	TTTACCTG GGCTAGCTACAACGA TGCCGCGC	9250
446	GGCAACAG G UAAACUCC	4454	GGAGTTTA GGCTAGCTACAACGA CTGTTGCC	9251
442	ACAGGUAA A CUCCACCA	4455	TGGTGGAG GGCTAGCTACAACGA TTACCTGT	9252
437	UAAACUCC A CCAACGAU	4456	ATCGTTGG GGCTAGCTACAACGA GGAGTTTA	9253
433	CUCCACCA A CGAUCUGA	4457	TCAGATCG GGCTAGCTACAACGA TGGTGGAG	9254
430	CACCAACG A UCUGACCA	4458	TGGTCAGA GGCTAGCTACAACGA CGTTGGTG	9255
425	ACGAUCUG A CCACCGCC	4459	GGCGGTGG GGCTAGCTACAACGA CAGATCGT	9256
422	AUCUGACC A CCGCCCGG	4460	CCGGGCGG GGCTAGCTACAACGA GGTCAGAT	9257
419	UGACCACC G CCCGGGAA	4461	TTCCCGGG GGCTAGCTACAACGA GGTGGTCA	9258
411	GCCCGGGA A CUUGACGU	4462	ACGTCAAG GGCTAGCTACAACGA TCCCGGGC	9259
406	GGAACUUG A CGUCCUGU	4463	ACAGGACG GGCTAGCTACAACGA CAAGTTCC	9260
404	AACUUGAC G UCCUGUGG	4464	CCACAGGA GGCTAGCTACAACGA GTCAAGTT	9261
399	GACGUCCU G UGGGCGGC	4465	GCCGCCCA GGCTAGCTACAACGA AGGACGTC	9262
395	UCCUGUGG G CGGCGGUU	4466	AACCGCCG GGCTAGCTACAACGA CCACAGGA	9263
392	UGUGGGCG G CGGUUGGU	4467	ACCAACCG GGCTAGCTACAACGA CGCCCACA	9264
389	GGGCGGCG G UUGGUGUU	4468	AACACCAA GGCTAGCTACAACGA CGCCGCCC	9265
385	GGCGGUUG G UGUUACGU	4469	ACGTAACA GGCTAGCTACAACGA CAACCGCC	9266
383	CGGUUGGU G UUACGUUU	4470	AAACGTAA GGCTAGCTACAACGA ACCAACCG	9267
380	UUGGUGUU A CGUUUGGU	4471	ACCAAACG GGCTAGCTACAACGA AACACCAA	9268
378	GGUGUUAC G UUUGGUUU	4472	AAACCAAA GGCTAGCTACAACGA GTAACACC	9269
373	UACGUUUG G UUUUUCUU	4473	AAGAAAAA GGCTAGCTACAACGA CAAACGTA	9270
360	UCUUUGAG G UUUAGGAU	4474	ATCCTAAA GGCTAGCTACAACGA CTCAAAGA	9271
353	GGUUUAGG A UUCGUGCU	4475	AGCACGAA GGCTAGCTACAACGA CCTAAACC	9272
349	UAGGAUUC G UGCUCAUG	4476	CATGAGCA GGCTAGCTACAACGA GAATCCTA	9273
347	GGAUUCGU G CUCAUGGU	4477	ACCATGAG GGCTAGCTACAACGA ACGAATCC	9274
343	UCGUGCUC A UGGUGCAC	4478	GTGCACCA GGCTAGCTACAACGA GAGCACGA	9275
340	UGCUCAUG G UGCACGGU	4479	ACCGTGCA GGCTAGCTACAACGA CATGAGCA	9276
338	CUCAUGGU G CACGGUCU	4480	AGACCGTG GGCTAGCTACAACGA ACCATGAG	9277
336	CAUGGUGC A CGGUCUAC	4481	GTAGACCG GGCTAGCTACAACGA GCACCATG	9278
333	GGUGCACG G UCUACGAG	4482	CTCGTAGA GGCTAGCTACAACGA CGTGCACC	9279
329	CACGGUCU A CGAGACCU	4483	AGGTCTCG GGCTAGCTACAACGA AGACCGTG	9280
324	UCUACGAG A CCUCCCGG	4484	CCGGGAGG GGCTAGCTACAACGA CTCGTAGA	9281
314	CUCCCGGG G CACUCGCA	4485	TGCGAGTG GGCTAGCTACAACGA CCCGGGAG	9282
312	CCCGGGGC A CUCGCAAG	4486	CTTGCGAG GGCTAGCTACAACGA GCCCCGGG	9283
308	GGGCACUC G CAAGCACC	4487	GGTGCTTG GGCTAGCTACAACGA GAGTGCCC	9284
304	ACUCGCAA G CACCCUAU	4488	ATAGGGTG GGCTAGCTACAACGA TTGCGAGT	9285
302	UCGCAAGC A CCCUAUCA	4489	TGATAGGG GGCTAGCTACAACGA GCTTGCGA	9286
297	AGCACCCU A UCAGGCAG	4490	CTGCCTGA GGCTAGCTACAACGA AGGGTGCT	9287
292	CCUAUCAG G CAGUACCA	4491	TGGTACTG GGCTAGCTACAACGA CTGATAGG	9288
289	AUCAGGCA G UACCACAA	4492	TTGTGGTA GGCTAGCTACAACGA TGCCTGAT	9289
287	CAGGCAGU A CCACAAGG	4493	CCTTGTGG GGCTAGCTACAACGA ACTGCCTG	9290
284	GCAGUACC A CAAGGCCU	4494	AGGCCTTG GGCTAGCTACAACGA GGTACTGC	9291
279	ACCACAAG G CCUUUCGC	4495	GCGAAAGG GGCTAGCTACAACGA CTTGTGGT	9292

272	GGCCUUUC G CGACCCAA	4496	TTGGGTCG GGCTAGCTACAACGA GAAAGGCC	9293
269	CUUUCGCG A CCCAACAC	4497	GTGTTGGG GGCTAGCTACAACGA CGCGAAAG	9294
264	GCGACCCA A CACUACUC	4498	GAGTAGTG GGCTAGCTACAACGA TGGGTCGC	9295
262	GACCCAAC A CUACUCGG	4499	CCGAGTAG GGCTAGCTACAACGA GTTGGGTC	9296
259	CCAACACU A CUCGGCUA	4500	TAGCCGAG GGCTAGCTACAACGA AGTGTTGG	9297
254	ACUACUCG G CUAGCAGU	4501	ACTGCTAG GGCTAGCTACAACGA CGAGTAGT	9298
250	CUCGGCUA G CAGUCUCG	4502	CGAGACTG GGCTAGCTACAACGA TAGCCGAG	9299
247	GGCUAGCA G UCUCGCGG	4503	CCGCGAGA GGCTAGCTACAACGA TGCTAGCC	9300
242	GCAGUCUC G CGGGGGCA	4504	TGCCCCCG GGCTAGCTACAACGA GAGACTGC	9301
236	UCGCGGGG G CACGCCCA	4505	TGGGCGTG GGCTAGCTACAACGA CCCCGCGA	9302
234	GCGGGGGC A CGCCCAAA	4506	TTTGGGCG GGCTAGCTACAACGA GCCCCCGC	9303
232	GGGGGCAC G CCCAAAUC	4507	GATTTGGG GGCTAGCTACAACGA GTGCCCCC	9304
226	ACGCCCAA A UCUCCAGG	4508	CCTGGAGA GGCTAGCTACAACGA TTGGGCGT	9305
218	AUCUCCAG G CAUUGAGC	4509	GCTCAATG GGCTAGCTACAACGA CTGGAGAT	9306
216	CUCCAGGC A UUGAGCGG	4510	CCGCTCAA GGCTAGCTACAACGA GCCTGGAG	9307
211	GGCAUUGA G CGGGUUGA	4511	TCAACCCG GGCTAGCTACAACGA TCAATGCC	9308
207	UUGAGCGG G UUGAUCCA	4512	TGGATCAA GGCTAGCTACAACGA CCGCTCAA	9309
203	GCGGGUUG A UCCAAGAA	4513	TTCTTGGA GGCTAGCTACAACGA CAACCCGC	9310
191	AAGAAAGG A CCCGGUCG	4514	CGACCGGG GGCTAGCTACAACGA CCTTTCTT	9311
186	AGGACCCG G UCGUCCUG	4515	CAGGACGA GGCTAGCTACAACGA CGGGTCCT	9312
183	ACCCGGUC G UCCUGGCA	4516	TGCCAGGA GGCTAGCTACAACGA GACCGGGT	9313
177	UCGUCCUG G CAAUUCCG	4517	CGGAATTG GGCTAGCTACAACGA CAGGACGA	9314
174	UCCUGGCA A UUCCGGUG	4518	CACCGGAA GGCTAGCTACAACGA TGCCAGGA	9315
168	CAAUUCCG G UGUACUCA	4519	TGAGTACA GGCTAGCTACAACGA CGGAATTG	9316
166	AUUCCGGU G UACUCACC	4520	GGTGAGTA GGCTAGCTACAACGA ACCGGAAT	9317
164	UCCGGUGU A CUCACCGG	4521	CCGGTGAG GGCTAGCTACAACGA ACACCGGA	9318
160	GUGUACUC A CCGGUUCC	4522	GGAACCGG GGCTAGCTACAACGA GAGTACAC	9319
156	ACUCACCG G UUCCGCAG	4523	CTGCGGAA GGCTAGCTACAACGA CGGTGAGT	9320
151	CCGGUUCC G CAGACCAC	4524	GTGGTCTG GGCTAGCTACAACGA GGAACCGG	9321
147	UUCCGCAG A CCACUAUG	4525	CATAGTGG GGCTAGCTACAACGA CTGCGGAA	9322
144	CGCAGACC A CUAUGGCU	4526	AGCCATAG GGCTAGCTACAACGA GGTCTGCG	9323
141	AGACCACU A UGGCUCUC	4527	GAGAGCCA GGCTAGCTACAACGA AGTGGTCT	9324
138	CCACUAUG G CUCUCCCG	4528	CGGGAGAG GGCTAGCTACAACGA CATAGTGG	9325
120	GAGGGGGG G UCCUGGAG	4529	CTCCAGGA GGCTAGCTACAACGA CCCCCCTC	9326
111	UCCUGGAG G CUGCACGA	4530	TCGTGCAG GGCTAGCTACAACGA CTCCAGGA	9327
108	UGGAGGCU G CACGACAC	4531	GTGTCGTG GGCTAGCTACAACGA AGCCTCCA	9328
106	GAGGCUGC A CGACACUC	4532	GAGTGTCG GGCTAGCTACAACGA GCAGCCTC	9329
103	GCUGCACG A CACUCAUA	4533	TATGAGTG GGCTAGCTACAACGA CGTGCAGC	9330
101	UGCACGAC A CUCAUACU	4534	AGTATGAG GGCTAGCTACAACGA GTCGTGCA	9331
97	CGACACUC A UACUAACG	4535	CGTTAGTA GGCTAGCTACAACGA GAGTGTCG	9332
95	ACACUCAU A CUAACGCC	4536	GGCGTTAG GGCTAGCTACAACGA ATGAGTGT	9333
91	UCAUACUA A CGCCAUGG	4537	CCATGGCG GGCTAGCTACAACGA TAGTATGA	9334
89	AUACUAAC G CCAUGGCU	4538	AGCCATGG GGCTAGCTACAACGA GTTAGTAT	9335
86	CUAACGCC A UGGCUAGA	4539	TCTAGCCA GGCTAGCTACAACGA GGCGTTAG	9336
83	ACGCCAUG G CUAGACGC	4540	GCGTCTAG GGCTAGCTACAACGA CATGGCGT	9337
78	AUGGCUAG A CGCUUUCU	4541	AGAAAGCG GGCTAGCTACAACGA CTAGCCAT	9338
76	GGCUAGAC G CUUUCUGC	4542	GCAGAAAG GGCTAGCTACAACGA GTCTAGCC	9339
69	CGCUUUCU G CGUGAAGA	4543	TCTTCACG GGCTAGCTACAACGA AGAAAGCG	9340
67	CUUUCUGC G UGAAGACA	4544	TGTCTTCA GGCTAGCTACAACGA GCAGAAAG	9341
61	GCGUGAAG A CAGUAGUU	4545	AACTACTG GGCTAGCTACAACGA CTTCACGC	9342
58	UGAAGACA G UAGUUCCU	4546	AGGAACTA GGCTAGCTACAACGA TGTCTTCA	9343
55	AGACAGUA G UUCCUCAC	4547	GTGAGGAA GGCTAGCTACAACGA TACTGTCT	9344
48	AGUUCCUC A CAGGGGAG	4548	CTCCCCTG GGCTAGCTACAACGA GAGGAACT	9345
40	ACAGGGGA G UGAUCUAU	4549	ATAGATCA GGCTAGCTACAACGA TCCCCTGT	9346
37	GGGGAGUG A UCUAUGGU	4550	ACCATAGA GGCTAGCTACAACGA CACTCCCC	9347
33	AGUGAUCU A UGGUGGAG	4551	CTCCACCA GGCTAGCTACAACGA AGATCACT	9348
30	GAUCUAUG G UGGAGUGU	4552	ACACTCCA GGCTAGCTACAACGA CATAGATC	9349

25	AUGGUGGA G UGUCGCCC	4553	GGGCGACA GGCTAGCTACAACGA TCCACCAT	9350
23	GGUGGAGU G UCGCCCCC	4554	GGGGGCGA GGCTAGCTACAACGA ACTCCACC	9351

Input Sequence = HPCK1S1. Cut Site = R/Y
Arm Length = 8. Core Sequence = GGCTAGCTACAACGA
HPCK1S1 Hepatitis C virus (strain HCV-1b, clone HCV-K1-S1), complete genome; acc# gi|1030702|dbj|D50483.1; 9410 nt

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Table V: Synthetic anti-HCV nucleic acid molecule and Target Sequences

ref pos	Ref Seq	Target	Seq ID	RPI#	Nucleic Acid	Seq ID	Nucleic Acid Alias
195	HCV+	GGGUCCU U UCUUGGA	4556	15364	$c_sc_sa_sa_s$ga cUGAuGaggcgaaagccGaa Aggacc **B**	9352	Hammerhead
342	HCV+	AGACCGUGCAUCAUGAGCAC	4555	17501	$G_sT_sG_sC_sT_sC_sA_sT_sG_sA_sT_sG_sC_sA_sC_sG_sG_sT_sC_sT$	9353	Antisense
195	HCV+	GGGUCCU U UCUUGGA	4556	17558	$c_sc_sa_sa_s$ga cUGAuGaggcguuagccGaZ Aggacc **B**	9354	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	17559	$c_sc_sa_sa_s$ga cUGAuGaggcguuagccGaa AggaZc **B**	9355	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	17560	$Z_sc_sa_sa_s$ga cUGAuGaggcguuagccGaa Aggacc **B**	9356	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	17561	Z $c_sa_sa_s$ga cUGAuGaggcguuagccGaa Aggacc **B**	9357	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	18012	ccaaga cUGAuGaggcguuagccGaa Aggacc **B**	9358	Hammerhead
82	HCV+	GCGUCUA G CCAUGGC	4557	18744	$g_sc_sc_sa_s$ugg GccgaaagG**C**GaGucaaGGu**C**u uagacgc **B**	9359	Zinzyme
100	HCV+	AGUAUGA G UGUCGUG	4558	18745	$c_sa_sc_sg_s$aca GccgaaagG**C**GaGucaaGGu**C**u ucauacu **B**	9360	Zinzyme
102	HCV+	UAUGAGU G UCGUGCA	4559	18746	$u_sg_sc_sa_s$cga GccgaaagG**C**GaGucaaGGu**C**u acucaua **B**	9361	Zinzyme
105	HCV+	GAGUGUC G UGCAGCC	4560	18747	$g_sg_sc_su_s$gca Gccgaaag**G**CGaGucaaGGu**C**u gacacuc **B**	9362	Zinzyme
107	HCV+	GUGUCGU G CAGCCUC	4561	18748	$g_sa_sg_sg_s$cug GccgaaagGCGaGucaaGGuCu acgacac **B**	9363	Zinzyme
146	HCV+	CAUAGUG G UCUGCGG	4562	18749	$c_sc_sg_sc_s$aga GccgaaagGCGaGucaaGGuCu cacuaug **B**	9364	Zinzyme
190	HCV+	CGACCGG G UCCUUUC	4563	18750	$g_sa_sa_sa_s$gga GccgaaagG**C**GaGucaaGGu**C**u ccggucg **B**	9365	Zinzyme
217	HCV+	GCUCAAU G CCUGGAG	4564	18751	$c_su_sc_sc_s$agg GccgaaagG**C**GaGucaaGGu**C**u auugagc **B**	9366	Zinzyme
231	HCV+	GAUUUGG G CGUGCCC	4565	18752	$g_sg_sg_sc_s$acg GccgaaagG**C**GaGucaaGGu**C**u ccaaauc **B**	9367	Zinzyme
258	HCV+	UAGCCGA G UAGUGUU	4566	18753	$a_sa_sc_sa_s$cua GccgaaagG**C**GaGucaaGGu**C**u ucggcua **B**	9368	Zinzyme
307	HCV+	GGUGCUU G CGAGUGC	4567	18754	$g_sc_sa_sc_s$ucg GccgaaagG**C**GaGucaaGGu**C**u aagcacc **B**	9369	Zinzyme
77	HCV+	GAAAGC G UCUAGC	4568	18755	$g_sc_su_sa_s$ga GccgaaagG**C**GaGucaaGGu**C**u gcuuuc **B**	9370	Zinzyme
77	HCV+	AGAAAGC G UCUAGCC	4569	18756	$g_sg_sc_su_s$aga GccgaaagG**C**GaGucaaGGu**C**u gcuuucu **B**	9371	Zinzyme
88	HCV+	AGCCAUG G CGUUAGU	4570	18757	$a_sc_su_sa_s$acg GccgaaagG**C**GaGucaaGGu**C**u cauggcu **B**	9372	Zinzyme
94	HCV+	GGCGUUA G UAUGAGU	4571	18758	$a_sc_su_sc_s$aua GccgaaagG**C**GaGucaaGGu**C**u uaacgcc **B**	9373	Zinzyme
102	HCV+	AUGAGU G UCGUGC	4572	18759	$g_sc_sa_sc_s$ga GccgaaagG**C**GaGucaaGGu**C**u acucau **B**	9374	Zinzyme
105	HCV+	AGUGUC G UGCAGC	4573	18760	$g_sc_su_sg_s$ca GccgaaagG**C**GaGucaaGGu**C**u gacacu **B**	9375	Zinzyme
110	HCV+	UCGUGCA G CCUCCAG	4574	18761	$c_su_sg_sg_s$agg GccgaaagG**C**GaGucaaGGu**C**u ugcacga **B**	9376	Zinzyme
137	HCV+	GGGAGA G CCAUAG	4575	18762	$c_su_sa_su_s$gg GccgaaagG**C**GaGucaaGGu**C**u ucuccc **B**	9377	Zinzyme
137	HCV+	CGGGAGA G CCAUAGU	4576	18763	$a_sc_su_sa_s$ugg GccgaaagG**C**GaGucaaGGu**C**u ucucccg **B**	9378	Zinzyme
146	HCV+	AUAGUG G UCUGCG	4577	18764	$c_sg_sc_sa_s$ga GccgaaagG**C**GaGucaaGGu**C**u cacuau **B**	9379	Zinzyme
150	HCV+	GUGGUCU G CGGAACC	4578	18765	$g_sg_su_su_s$ccg GccgaaagG**C**GaGucaaGGu**C**u agaccac **B**	9380	Zinzyme

176	HCV+	CGGAAUU G CCAGGAC	4579	18766	$g_s u_s c_s c_s$ugg GccgaaagG**C**GaGucaaGGu**C**u aauuccg **B**	9381	Zinzyme
190	HCV+	GACCGG G UCCUUU	4580	18767	$a_s a_s a_s g_s$ga GccgaaagG**C**GaGucaaGGu**C**u ccgguc **B**	9382	Zinzyme
253	HCV+	CUGCUA G CCGAGU	4581	18768	$a_s c_s u_s c_s$gg GccgaaagG**C**GaGucaaGGu**C**u uagcag **B**	9383	Zinzyme
253	HCV+	ACUGCUA G CCGAGUA	4582	18769	$u_s a_s c_s u_s$cgg GccgaaagG**C**GaGucaaGGu**C**u uagcagu **B**	9384	Zinzyme
258	HCV+	AGCCGA G UAGUGU	4583	18770	$a_s c_s a_s c_s$ua GccgaaagG**C**GaGucaaGGu**C**u ucggcu **B**	9385	Zinzyme
263	HCV+	GAGUAGU G UUGGGUC	4584	18771	$g_s a_s c_s c_s$caa GccgaaagG**C**GaGucaaGGu**C**u acuacuc **B**	9386	Zinzyme
268	HCV+	UGUUGG G UCGCGA	4585	18772	$u_s c_s g_s c_s$ga GccgaaagG**C**GaGucaaGGu**C**u ccaaca **B**	9387	Zinzyme
268	HCV+	GUGUUGG G UCGCGAA	4586	18773	$u_s u_s c_s g_s$cga GccgaaagG**C**GaGucaaGGu**C**u ccaacac **B**	9388	Zinzyme
271	HCV+	UUGGGUC G CGAAAGG	4587	18774	$c_s c_s u_s u_s$ucg GccgaaagG**C**GaGucaaGGu**C**u gacccaa **B**	9389	Zinzyme
283	HCV+	AGGCCUU G UGGUACU	4588	18775	$a_s g_s u_s a_s$cca GccgaaagG**C**GaGucaaGGu**C**u aaggccu **B**	9390	Zinzyme
286	HCV+	CCUUGUG G UACUGCC	4589	18776	$g_s g_s c_s a_s$gua GccgaaagG**C**GaGucaaGGu**C**u cacaagg **B**	9391	Zinzyme
291	HCV+	UGGUACU G CCUGAUA	4590	18777	$u_s a_s u_s c_s$agg GccgaaagG**C**GaGucaaGGu**C**u aguacca **B**	9392	Zinzyme
301	HCV+	UGAUAGG G UGCUUGC	4591	18778	$g_s c_s a_s a_s$gca GccgaaagG**C**GaGucaaGGu**C**u ccuauca **B**	9393	Zinzyme
303	HCV+	AUAGGGU G CUUGCGA	4592	18779	$u_s c_s g_s c_s$aag GccgaaagG**C**GaGucaaGGu**C**u acccuau **B**	9394	Zinzyme
60	HCV+	ACUACU G UCUUCA	4593	18780	$u_s g_s a_s a_s$ga GccgaaagG**C**GaGucaaGGu**C**u aguagu **B**	9395	Zinzyme
60	HCV+	AACUACU G UCUUCAC	4594	18781	$g_s u_s g_s a_s$aga GccgaaagG**C**GaGucaaGGu**C**u aguaguu **B**	9396	Zinzyme
68	HCV+	UCUUCAC G CAGAAAG	4595	18782	$c_s u_s u_s u_s$cug GccgaaagG**C**GaGucaaGGu**C**u gugaaga **B**	9397	Zinzyme
75	HCV+	CAGAAA G CGUCUA	4596	18783	$u_s a_s g_s a_s$cg GccgaaagG**C**GaGucaaGGu**C**u uuucug **B**	9398	Zinzyme
82	HCV+	CGUCUA G CCAUGG	4597	18784	$c_s c_s a_s u_s$gg GccgaaagG**C**GaGucaaGGu**C**u uagacg **B**	9399	Zinzyme
88	HCV+	GCCAUG G CGUUAG	4598	18785	$c_s u_s a_s a_s$cg GccgaaagG**C**GaGucaaGGu**C**u cauggc **B**	9400	Zinzyme
90	HCV+	CAUGGC G UUAGUA	4599	18786	$u_s a_s c_s u_s$aa GccgaaagG**C**GaGucaaGGu**C**u gccaug **B**	9401	Zinzyme
90	HCV+	CCAUGGC G UUAGUAU	4600	18787	$a_s u_s a_s c_s$uaa GccgaaagG**C**GaGucaaGGu**C**u gccaugg **B**	9402	Zinzyme
100	HCV+	GUAUGA G UGUCGU	4601	18788	$a_s c_s g_s a_s$ca GccgaaagG**C**GaGucaaGGu**C**u ucauac **B**	9403	Zinzyme
107	HCV+	UGUCGU G CAGCCU	4602	18789	$a_s g_s g_s c_s$ug GccgaaagG**C**GaGucaaGGu**C**u acgaca **B**	9404	Zinzyme
110	HCV+	CGUGCA G CCUCCA	4603	18790	$u_s g_s g_s a_s$gg GccgaaagG**C**GaGucaaGGu**C**u ugcacg **B**	9405	Zinzyme
150	HCV+	UGGUCU G CGGAAC	4604	18791	$g_s u_s u_s c_s$cg GccgaaagG**C**GaGucaaGGu**C**u agacca **B**	9406	Zinzyme
159	HCV+	GGAACCG G UGAGUAC	4605	18792	$g_s u_s a_s c_s$uca GccgaaagG**C**GaGucaaGGu**C**u cgguucc **B**	9407	Zinzyme
176	HCV+	GGAAUU G CCAGGA	4606	18793	$u_s c_s c_s u_s$gg GccgaaagG**C**GaGucaaGGu**C**u aauucc **B**	9408	Zinzyme
217	HCV+	CUCAAU G CCUGGA	4607	18794	$u_s c_s c_s a_s$gg GccgaaagG**C**GaGucaaGGu**C**u auugag **B**	9409	Zinzyme
231	HCV+	AUUUGG G CGUGCC	4608	18795	$g_s g_s c_s a_s$cg GccgaaagG**C**GaGucaaGGu**C**u ccaaau **B**	9410	Zinzyme
261	HCV+	CGAGUA G UGUUGG	4609	18796	$c_s c_s a_s a_s$ca GccgaaagG**C**GaGucaaGGu**C**u uacucg **B**	9411	Zinzyme
261	HCV+	CCGAGUA G UGUUGGG	4610	18797	$c_s c_s c_s a_s$aca GccgaaagG**C**GaGucaaGGu**C**u uacucgg **B**	9412	Zinzyme
263	HCV+	AGUAGU G UUGGGU	4611	18798	$a_s c_s c_s c_s$aa GccgaaagG**C**GaGucaaGGu**C**u acuacu **B**	9413	Zinzyme
271	HCV+	UGGGUC G CGAAAG	4612	18799	$c_s u_s u_s u_s$cg GccgaaagG**C**GaGucaaGGu**C**u gaccca **B**	9414	Zinzyme
283	HCV+	GGCCUU G UGGUAC	4613	18800	$g_s u_s a_s c_s$ca GccgaaagG**C**GaGucaaGGu**C**u aaggcc **B**	9415	Zinzyme

291	HCV+	GGUACU G CCUGAU	4614	18801	$a_s u_s c_s a_s$gg GccgaaagG**C**GaGucaaGGu**C**u aguacc **B**	9416	Zinzyme
303	HCV+	UAGGGU G CUUGCG	4615	18802	$c_s g_s c_s a_s$ag GccgaaagG**C**GaGucaaGGu**C**u acccua **B**	9417	Zinzyme
307	HCV+	GUGCUU G CGAGUG	4616	18803	$c_s a_s c_s u_s$cg GccgaaagG**C**GaGucaaGGu**C**u aagcac **B**	9418	Zinzyme
323	HCV+	CGGGAG G UCUCGU	4617	18804	$a_s c_s g_s a_s$ga GccgaaagG**C**GaGucaaGGu**C**u cucccg **B**	9419	Zinzyme
323	HCV+	CCGGGAG G UCUCGUA	4618	18805	$u_s a_s c_s g_s$aga GccgaaagG**C**GaGucaaGGu**C**u cucccgg **B**	9420	Zinzyme
75	HCV+	GCAGAAA G CGUCUAG	4619	18806	$c_s u_s a_s g_s$acg GccgaaagG**C**GaGucaaGGu**C**u uuucugc **B**	9421	Zinzyme
143	HCV+	GCCAUA G UGGUCU	4620	18807	$a_s g_s a_s c_s$ca GccgaaagG**C**GaGucaaGGu**C**u uauggc **B**	9422	Zinzyme
278	HCV+	GCGAAAG G CCUUGUG	4621	18808	$c_s a_s c_s a_s$agg GccgaaagG**C**GaGucaaGGu**C**u cuuucgc **B**	9423	Zinzyme
163	HCV+	CGGUGA G UACACC	4622	18809	$g_s g_s u_s g_s$ua GccgaaagG**C**GaGucaaGGu**C**u ucaccg **B**	9424	Zinzyme
68	HCV+	CUUCAC G CAGAAA	4623	18810	$u_s u_s u_s c_s$ug GccgaaagG**C**GaGucaaGGu**C**u gugaag **B**	9425	Zinzyme
94	HCV+	GCGUUA G UAUGAG	4624	18811	$c_s u_s c_s a_s$ua GccgaaagG**C**GaGucaaGGu**C**u uaacgc **B**	9426	Zinzyme
143	HCV+	AGCCAUA G UGGUCUG	4625	18812	$c_s a_s g_s a_s$cca GccgaaagG**C**GaGucaaGGu**C**u uauggcu **B**	9427	Zinzyme
159	HCV+	GAACCG G UGAGUA	4626	18813	$u_s a_s c_s u_s$ca GccgaaagG**C**GaGucaaGGu**C**u cgguuc **B**	9428	Zinzyme
163	HCV+	CCGGUGA G UACACCG	4627	18814	$c_s g_s g_s u_s$gua GccgaaagG**C**GaGucaaGGu**C**u ucaccgg **B**	9429	Zinzyme
249	HCV+	GAGACU G CUAGCC	4628	18815	$g_s g_s c_s u_s$ag GccgaaagG**C**GaGucaaGGu**C**u agucuc **B**	9430	Zinzyme
249	HCV+	CGAGACU G CUAGCCG	4629	18816	$c_s g_s g_s c_s$uag GccgaaagG**C**GaGucaaGGu**C**u agucucg **B**	9431	Zinzyme
278	HCV+	CGAAAG G CCUUGU	4630	18817	$a_s c_s a_s a_s$gg GccgaaagG**C**GaGucaaGGu**C**u cuuucg **B**	9432	Zinzyme
286	HCV+	CUUGUG G UACUGC	4631	18818	$g_s c_s a_s g_s$ua GccgaaagG**C**GaGucaaGGu**C**u cacaag **B**	9433	Zinzyme
301	HCV+	GAUAGG G UGCUUG	4632	18819	$c_s a_s a_s g_s$ca GccgaaagG**C**GaGucaaGGu**C**u ccuauc **B**	9434	Zinzyme
328	HCV+	GGUCUC G UAGACC	4633	18820	$g_s g_s u_s c_s$ua GccgaaagG**C**GaGucaaGGu**C**u gagacc **B**	9435	Zinzyme
328	HCV+	AGGUCUC G UAGACCG	4634	18821	$c_s g_s g_s u_s$cua GccgaaagG**C**GaGucaaGGu**C**u gagaccu **B**	9436	Zinzyme
335	HCV+	UAGACC G UGCACC	4635	18822	$g_s g_s u_s g_s$ca GccgaaagG**C**GaGucaaGGu**C**u ggucua **B**	9437	Zinzyme
30	C	UAAACCU C AAAGAAA	4636	19108	$u_s u_s u_s c_s$uuu c**U**GAuGaggccguuaggccGaa Agguuua **B**	9438	Hammerhead
48	C	CAAACGU A ACACCAA	4637	19109	$u_s u_s g_s g_s$ugu c**U**GAuGaggccguuaggccGaa Acguuug **B**	9439	Hammerhead
60	C	CAACCGU C GCCCACA	4638	19110	$u_s g_s u_s g_s$ggc c**U**GAuGaggccguuaggccGaa Acgguug **B**	9440	Hammerhead
175	C	GAGCGGU C ACAACCU	4639	19111	$a_s g_s g_s u_s$ugu c**U**GAuGaggccguuaggccGaa Accgcuc **B**	9441	Hammerhead
374	C	GUAAGGU C AUCGAUA	4640	19112	$u_s a_s u_s c_s$gau c**U**GAuGaggccguuaggccGaa Accuuac **B**	9442	Hammerhead
258	S27	UGGUGGCUCCAUCUUAGCCCUAG	4641	22022	$u_s g_s g_s u_s g_s g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g$	9443	Antisense
259	S27	GGUGGCUCCAUCUUAGCCCUAGU	4642	22023	$g_s g_s u_s g_s g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u$	9444	Antisense
260	S27	GUGGCUCCAUCUUAGCCCUAGUC	4643	22024	$g_s u_s g_s g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c$	9445	Antisense
261	S27	UGGCUCCAUCUUAGCCCUAGUCA	4644	22025	$u_s g_s g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a$	9446	Antisense
262	S27	GGCUCCAUCUUAGCCCUAGUCAC	4645	22026	$g_s g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c$	9447	Antisense
263	S27	GCUCCAUCUUAGCCCUAGUCACG	4646	22027	$g_s c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g$	9448	Antisense
264	S27	CUCCAUCUUAGCCCUAGUCACGG	4647	22028	$c_s u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g$	9449	Antisense
265	S27	UCCAUCUUAGCCCUAGUCACGGC	4648	22029	$u_s c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c$	9450	Antisense

266	S27	CCAUCUUAGCCCUAGUCACGGCU	4649	22030	$c_s c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u$	9451	Antisense
267	S27	CAUCUUAGCCCUAGUCACGGCUA	4650	22031	$c_s a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a$	9452	Antisense
268	S27	AUCUUAGCCCUAGUCACGGCUAG	4651	22032	$a_s u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g$	9453	Antisense
269	S27	UCUUAGCCCUAGUCACGGCUAGC	4652	22033	$u_s c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c$	9454	Antisense
270	S27	CUUAGCCCUAGUCACGGCUAGCU	4653	22034	$c_s u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u$	9455	Antisense
271	S27	UUAGCCCUAGUCACGGCUAGCUG	4654	22035	$u_s u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g$	9456	Antisense
272	S27	UAGCCCUAGUCACGGCUAGCUGU	4655	22036	$u_s a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u$	9457	Antisense
273	S27	AGCCCUAGUCACGGCUAGCUGUG	4656	22037	$a_s g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g$	9458	Antisense
274	S27	GCCCUAGUCACGGCUAGCUGUGA	4657	22038	$g_s c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a$	9459	Antisense
275	S27	CCCUAGUCACGGCUAGCUGUGAA	4658	22039	$c_s c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a$	9460	Antisense
276	S27	CCUAGUCACGGCUAGCUGUGAAA	4659	22040	$c_s c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a$	9461	Antisense
277	S27	CUAGUCACGGCUAGCUGUGAAAG	4660	22041	$c_s u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g$	9462	Antisense
278	S27	UAGUCACGGCUAGCUGUGAAAGG	4661	22042	$u_s a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g$	9463	Antisense
279	S27	AGUCACGGCUAGCUGUGAAAGGU	4662	22043	$a_s g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u$	9464	Antisense
280	S27	GUCACGGCUAGCUGUGAAAGGUC	4663	22044	$g_s u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c$	9465	Antisense
281	S27	UCACGGCUAGCUGUGAAAGGUCC	4664	22045	$u_s c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c$	9466	Antisense
282	S27	CACGGCUAGCUGUGAAAGGUCCG	4665	22046	$c_s a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g$	9467	Antisense
283	S27	ACGGCUAGCUGUGAAAGGUCCGU	4666	22047	$a_s c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g_s u$	9468	Antisense
284	S27	CGGCUAGCUGUGAAAGGUCCGUG	4667	22048	$c_s g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g_s u_s g$	9469	Antisense
285	S27	GGCUAGCUGUGAAAGGUCCGUGA	4668	22049	$g_s g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g_s u_s g_s a$	9470	Antisense
286	S27	GCUAGCUGUGAAAGGUCCGUGAG	4669	22050	$g_s c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g_s u_s g_s a_s g$	9471	Antisense
287	S27	CUAGCUGUGAAAGGUCCGUGAGC	4670	22051	$c_s u_s a_s g_s c_s u_s g_s u_s g_s a_s a_s a_s g_s g_s u_s c_s c_s g_s u_s g_s a_s g_s c$	9472	Antisense
311	S27	GCAUGACUGCAGAGAGUGCUGAU	4671	22052	$g_s c_s a_s u_s g_s a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u$	9473	Antisense
312	S27	CAUGACUGCAGAGAGUGCUGAUA	4672	22053	$c_s a_s u_s g_s a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a$	9474	Antisense
313	S27	AUGACUGCAGAGAGUGCUGAUAC	4673	22054	$a_s u_s g_s a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c$	9475	Antisense
314	S27	UGACUGCAGAGAGUGCUGAUACU	4674	22055	$u_s g_s a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u$	9476	Antisense
315	S27	GACUGCAGAGAGUGCUGAUACUG	4675	22056	$g_s a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g$	9477	Antisense
316	S27	ACUGCAGAGAGUGCUGAUACUGG	4676	22057	$a_s c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g$	9478	Antisense
317	S27	CUGCAGAGAGUGCUGAUACUGGC	4677	22058	$c_s u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c$	9479	Antisense
318	S27	UGCAGAGAGUGCUGAUACUGGCC	4678	22059	$u_s g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c_s c$	9480	Antisense
319	S27	GCAGAGAGUGCUGAUACUGGCCU	4679	22060	$g_s c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c_s c_s u$	9481	Antisense
320	S27	CAGAGAGUGCUGAUACUGGCCUC	4680	22061	$c_s a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c_s c_s u_s c$	9482	Antisense
321	S27	AGAGAGUGCUGAUACUGGCCUCU	4681	22062	$a_s g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c_s c_s u_s c_s u$	9483	Antisense
322	S27	GAGAGUGCUGAUACUGGCCUCUC	4682	22063	$g_s a_s g_s a_s g_s u_s g_s c_s u_s g_s a_s u_s a_s c_s u_s g_s g_s c_s c_s u_s c_s u_s c$	9484	Antisense
157	HCV+	CGGAACCGGUGAG	4683	22524	$c_s u_s c_s a_s$cc c<u>U</u>GAuGaggccguuaggccGaa luuccg **B**	9485	Inozyme

167	HCV+	GAGUACACCGGAA	4684	22525	$u_s u_s c_s c_s$gg c**U**GAuGaggccguuaggccGaa luacuc **B**	9486	Inozyme
139	HCV+	GAGAGCCAUAGUG	4685	22526	$c_s a_s c_s u_s$au c**U**GAuGaggccguuaggccGaa lcucuc **B**	9487	Inozyme
140	HCV+	AGAGCCAUAGUGG	4686	22527	$c_s c_s a_s c_s$ua c**U**GAuGaggccguuaggccGaa lgcucu **B**	9488	Inozyme
281	HCV+	AAGGCCUUGUGGU	4687	22528	$a_s c_s c_s a_s$ca c**U**GAuGaggccguuaggccGaa lgccuu **B**	9489	Inozyme
130	HCV+	CCCUCCCGGGAGA	4688	22529	$u_s c_s u_s c_s$cc c**U**GAuGaggccguuaggccGaa lgaggg **B**	9490	Inozyme
280	HCV+	AAAGGCCUUGUGG	4689	22530	$c_s c_s a_s c_s$aa c**U**GAuGaggccguuaggccGaa lccuuu **B**	9491	Inozyme
149	HCV+	GUGGUCUGCGGAA	4690	22531	$u_s u_s c_s c_s$gc c**U**GAuGaggccguuaggccGaa laccac **B**	9492	Inozyme
194	HCV+	GGGUCCUUUCUUG	4691	22532	$c_s a_s a_s g_s$aa c**U**GAuGaggccguuaggccGaa lgaccc **B**	9493	Inozyme
255	HCV+	GCUAGCCGAGUAG	4692	22533	$c_s u_s a_s c_s$uc c**U**GAuGaggccguuaggccGaa lcuagc **B**	9494	Inozyme
294	HCV+	ACUGCCUGAUAGG	4693	22534	$c_s c_s u_s a_s$uc c**U**GAuGaggccguuaggccGaa lgcagu **B**	9495	Inozyme
293	HCV+	UACUGCCUGAUAG	4694	22535	$c_s u_s a_s u_s$ca c**U**GAuGaggccguuaggccGaa lcagua **B**	9496	Inozyme
290	HCV+	UGGUACUGCCUGA	4695	22536	$u_s c_s a_s g_s$gc c**U**GAuGaggccguuaggccGaa luacca **B**	9497	Inozyme
169	HCV+	GUACACCGGAAUU	4696	22537	$a_s a_s u_s u_s$cc c**U**GAuGaggccguuaggccGaa luguac **B**	9498	Inozyme
293	HCV+	GUACUGCCUGAUAGG	4697	22544	$c_s c_s u_s a_s$uca c**U**GAuGaggccguuaggccGaa lcaguac **B**	9499	Inozyme
294	HCV+	UACUGCCUGAUAGGG	4698	22545	$c_s c_s c_s u_s$auc c**U**GAuGaggccguuaggccGaa lgcagua **B**	9500	Inozyme
281	HCV+	AAAGGCCUUGUGGUA	4699	22546	$u_s a_s c_s c_s$aca c**U**GAuGaggccguuaggccGaa lgccuuu **B**	9501	Inozyme
166	HCV+	UGAGUACACCGGA	4700	22549	$u_s c_s c_s g_s$gu c***U***GA***U***Gaggccguuaggccgaa ***U***acuca **B**	9502	Amberzyme
168	HCV+	AGUACACCGGAAU	4701	22550	$a_s u_s u_s c_s$cg c***U***GA***U***Gaggccguuaggccgaa ***U***guacu **B**	9503	Amberzyme
141	HCV+	GAGCCAUAGUGGU	4702	22551	$a_s c_s c_s a_s$cu c***U***GA***U***Gaggccguuaggccgaa ***U***ggcuc **B**	9504	Amberzyme
156	HCV+	GCGGAACCGGUGA	4703	22552	$u_s c_s a_s c_s$cg c***U***GA***U***Gaggccguuaggccgaa ***U***uccgc **B**	9505	Amberzyme
155	HCV+	UGCGGAACCGGUG	4704	22553	$c_s a_s c_s c_s$gg c***U***GA***U***Gaggccguuaggccgaa ***U***ccgca **B**	9506	Amberzyme
289	HCV+	GUGGUACUGCCUG	4705	22554	$c_s a_s g_s g_s$ca c***U***GA***U***Gaggccguuaggccgaa ***U***accac **B**	9507	Amberzyme
297	HCV+	GCCUGAUAGGGUG	4706	22555	$c_s a_s c_s c_s$cu c***U***GA***U***Gaggccguuaggccgaa ***U***caggc **B**	9508	Amberzyme
166	HCV+	GUGAGUACACCGGAA	4707	22556	$u_s u_s c_s c_s$ggu c***U***GA***U***Gaggccguuaggccgaa ***U***acucac **B**	9509	Amberzyme
141	HCV+	AGAGCCAUAGUGGUC	4708	22557	$g_s a_s c_s c_s$acu c***U***GA***U***Gaggccguuaggccgaa ***U***ggcucu **B**	9510	Amberzyme
156	HCV+	UGCGGAACCGGUGAG	4709	22558	$c_s u_s c_s a_s$ccg c***U***GA***U***Gaggccguuaggccgaa ***U***uccgca **B**	9511	Amberzyme
155	HCV+	CUGCGGAACCGGUGA	4710	22559	$u_s c_s a_s c_s$cgg c***U***GA***U***Gaggccguuaggccgaa ***U***ccgcag **B**	9512	Amberzyme
289	HCV+	UGUGGUACUGCCUGA	4711	22560	$u_s c_s a_s g_s$gca c***U***GA***U***Gaggccguuaggccgaa ***U***accaca **B**	9513	Amberzyme
297	HCV+	UGCCUGAUAGGGUGC	4712	22561	$g_s c_s a_s c_s$ccu c***U***GA***U***Gaggccguuaggccgaa ***U***caggca **B**	9514	Amberzyme
168	HCV+	GAGUACACCGGAAUU	4713	22562	$a_s a_s u_s u_s$ccg c***U***GA***U***Gaggccguuaggccgaa ***U***guacuc **B**	9515	Amberzyme
166	HCV-	UCCGGUGUACUCA	4714	22563	$u_s g_s a_s g_s$ua gccgaaaggc***C***gagugaGgu***C***u accgga **B**	9516	Zinzyme
168	HCV-	AUUCCGGUGUACU	4715	22564	$a_s g_s u_s a_s$ca gccgaaaggc***C***gagugaGgu***C***u cggaau **B**	9517	Zinzyme
138	HCV-	ACUAUGGCUCUCC	4716	22565	$g_s g_s a_s g_s$ag gccgaaaggc***C***gagugaGgu***C***u cauagu **B**	9518	Zinzyme
156	HCV-	UCACCGGUUCCGC	4717	22566	$g_s c_s g_s g_s$aa gccgaaaggc***C***gagugaGgu***C***u cgguga **B**	9519	Zinzyme
236	HCV-	GCGGGGGCACGCC	4718	22567	$g_s g_s c_s g_s$ug gccgaaaggc***C***gagugaGgu***C***u ccccgc **B**	9520	Zinzyme

279	HCV-	CACAAGGCCUUUC	4719	22568	$g_s a_s a_s a_s$gg gccgaaaggCgagugaGguCu cuugug **B**	9521	Zinzyme
151	HCV-	GGUUCCGCAGACC	4720	22569	$g_s g_s u_s c_s$ug gccgaaaggCgagugaGguCu ggaacc **B**	9522	Zinzyme
292	HCV-	UAUCAGGCAGUAC	4721	22570	$g_s u_s a_s c_s$ug gccgaaaggCgagugaGguCu cugaua **B**	9523	Zinzyme
289	HCV-	CAGGCAGUACCAC	4722	22571	$g_s u_s g_s g_s$ua gccgaaaggCgagugaGguCu ugccug **B**	9524	Zinzyme
166	HCV-	UUCCGGUGUACUCAC	4723	22572	$g_s u_s g_s a_s$gua gccgaaaggCgagugaGguCu accggaa **B**	9525	Zinzyme
279	HCV-	CCACAAGGCCUUUCG	4724	22573	$c_s g_s a_s a_s$agg gccgaaaggCgagugaGguCu cuugugg **B**	9526	Zinzyme
156	HCV-	CUCACCGGUUCCGCA	4725	22574	$u_s g_s c_s g_s$gaa gccgaaaggCgagugaGguCu cggugag **B**	9527	Zinzyme
138	HCV-	CACUAUGGCUCUCCC	4726	22575	$g_s g_s g_s a_s$gag gccgaaaggCgagugaGguCu cauagug **B**	9528	Zinzyme
151	HCV-	CGGUUCCGCAGACCA	4727	22576	$u_s g_s g_s u_s$cug gccgaaaggCgagugaGguCu ggaaccg **B**	9529	Zinzyme
292	HCV-	CUAUCAGGCAGUACC	4728	22577	$g_s g_s u_s a_s$cug gccgaaaggCgagugaGguCu cugauag **B**	9530	Zinzyme
289	HCV-	UCAGGCAGUACCACA	4729	22578	$u_s g_s u_s g_s$gua gccgaaaggCgagugaGguCu ugccuga **B**	9531	Zinzyme
168	HCV-	AAUUCCGGUGUACUC	4730	22579	$g_s a_s g_s u_s$aca gccgaaaggCgagugaGguCu cggaauu **B**	9532	Zinzyme
163	HCV-	GGUGUACUCACCG	4731	22580	$c_s g_s g_s u_s$ga c*U*GA*U*Gaggccguuaggcc Gaa *U*acacc **B**	9533	Amberzyme
159	HCV-	UACUCACCGGUUC	4732	22581	$g_s a_s a_s c_s$cg c*U*GA*U*Gaggccguuaggcc Gaa *U*gagua **B**	9534	Amberzyme
140	HCV-	CCACUAUGGCUCU	4733	22582	$a_s g_s a_s g_s$cc c*U*GA*U*Gaggccguuaggcc Gaa *U*agugg **B**	9535	Amberzyme
281	HCV-	ACCACAAGGCCUU	4734	22583	$a_s a_s g_s g_s$cc c*U*GA*U*Gaggccguuaggcc Gaa *U*guggu **B**	9536	Amberzyme
233	HCV-	GGGGCACGCCCAA	4735	22584	$u_s u_s g_s g_s$gc c*U*GA*U*Gaggccguuaggcc Gaa *U*gcccc **B**	9537	Amberzyme
143	HCV-	AGACCACUAUGGC	4736	22585	$g_s c_s c_s a_s$ua c*U*GA*U*Gaggccguuaggcc Gaa *U*ggucu **B**	9538	Amberzyme
146	HCV-	CGCAGACCACUAU	4737	22586	$a_s u_s a_s g_s$ug c*U*GA*U*Gaggccguuaggcc Gaa *U*cugcg **B**	9539	Amberzyme
195	HCV-	CCAAGAAAGGACC	4738	22587	$g_s g_s u_s c_s$cu c*U*GA*U*Gaggccguuaggcc Gaa *U*cuugg **B**	9540	Amberzyme
194	HCV-	CAAGAAAGGACCC	4739	22588	$g_s g_s g_s u_s$cc c*U*GA*U*Gaggccguuaggcc Gaa *U*ucuug **B**	9541	Amberzyme
283	HCV-	GUACCACAAGGCC	4740	22589	$g_s g_s c_s c_s$uu c*U*GA*U*Gaggccguuaggcc Gaa *U*gguac **B**	9542	Amberzyme
286	HCV-	GCAGUACCACAAG	4741	22590	$c_s u_s u_s g_s$ug c*U*GA*U*Gaggccguuaggcc Gaa *U*acugc **B**	9543	Amberzyme
296	HCV-	ACCCUAUCAGGCA	4742	22591	$u_s g_s c_s c_s$ug c*U*GA*U*Gaggccguuaggcc Gaa *U*agggu **B**	9544	Amberzyme
190	HCV-	AAAGGACCCGGUC	4743	22592	$g_s a_s c_s c_s$gg c*U*GA*U*Gaggccguuaggcc Gaa *U*ccuuu **B**	9545	Amberzyme
163	HCV-	CGGUGUACUCACCGG	4744	22593	$c_s c_s g_s g_s$uga c*U*GA*U*Gaggccguuaggcc Gaa *U*acaccg **B**	9546	Amberzyme
140	HCV-	ACCACUAUGGCUCUC	4745	22594	$g_s a_s g_s a_s$gcc c*U*GA*U*Gaggccguuaggcc Gaa *U*aguggu **B**	9547	Amberzyme
159	HCV-	GUACUCACCGGUUCC	4746	22595	$g_s g_s a_s a_s$ccg c*U*GA*U*Gaggccguuaggcc Gaa *U*gaguac **B**	9548	Amberzyme
233	HCV-	GGGGGCACGCCCAAA	4747	22596	$u_s u_s u_s g_s$ggc c*U*GA*U*Gaggccguuaggcc Gaa *U*gccccc **B**	9549	Amberzyme
143	HCV-	CAGACCACUAUGGCU	4748	22597	$a_s g_s c_s c_s$aua c*U*GA*U*Gaggccguuaggcc Gaa *U*ggucug **B**	9550	Amberzyme
146	HCV-	CCGCAGACCACUAUG	4749	22598	$c_s a_s u_s a_s$gug c*U*GA*U*Gaggccguuaggcc Gaa *U*cugcgg **B**	9551	Amberzyme
195	HCV-	UCCAAGAAAGGACCC	4750	22599	$g_s g_s g_s u_s$ccu c*U*GA*U*Gaggccguuaggcc Gaa *U*cuugga **B**	9552	Amberzyme
283	HCV-	AGUACCACAAGGCCU	4751	22600	$a_s g_s g_s c_s$cuu c*U*GA*U*Gaggccguuaggcc Gaa *U*gguacu **B**	9553	Amberzyme
281	HCV-	UACCACAAGGCCUUU	4752	22601	$a_s a_s a_s g_s$gcc c*U*GA*U*Gaggccguuaggcc Gaa *U*guggua **B**	9554	Amberzyme
296	HCV-	CACCCUAUCAGGCAG	4753	22602	$c_s u_s g_s c_s$cug c*U*GA*U*Gaggccguuaggcc Gaa *U*agggug **B**	9555	Amberzyme

286	HCV-	GGCAGUACCACAAGG	4754	22603	$c_s c_s u_s u_s$gug c***U***GA***U***Gaggccguuaggccgaa ***U***acugcc **B**	9556	Amberzyme
7985	HCV-	UCUCAGU G UCUUCCA	4765	22719	uggaaga uGAUg gcauGcacuaugc gCg acugaga **B**	9557	G-cleaver
4832	HCV-	UGUAUAU G CCUCUCC	4755	22720	ggagagg uGAUg gcauGcacuaugc gCg auauaca **B**	9558	G-cleaver
4153	HCV-	ACCGUGU G CCUUAGA	4756	22721	ucuaagg uGAUg gcauGcacuaugc gCg acacggu **B**	9559	G-cleaver
3200	HCV-	GUGGAGU G AGGUGGU	4757	22722	accaccu uGAUg gcauGcacuaugc gCg acuccac **B**	9560	G-cleaver
1682	HCV-	ACGAGUU G AACCUGU	4758	22723	acagguu uGAUg gcauGcacuaugc gCg aacucgu **B**	9561	G-cleaver
896	HCV+	CCUGUCU G ACCAUCC	4759	22724	ggauggu uGAUg gcauGcacuaugc gCg agacagg **B**	9562	G-cleaver
2504	HCV+	UCCUGUU G CUUUUCC	4762	22725	ggaaaag uGAUg gcauGcacuaugc gCg aacagga **B**	9563	G-cleaver
2651	HCV+	UCCUCGU G UUCUUCU	4763	22726	agaagaa uGAUg gcauGcacuaugc gCg acgagga **B**	9564	G-cleaver
4094	HCV+	ACAAAGU G CUCGUCC	4760	22727	ggacgag uGAUg gcauGcacuaugc gCg acuuugu **B**	9565	G-cleaver
8970	HCV+	GCCACUU G ACCUACC	4761	22728	gguaggu uGAUg gcauGcacuaugc gCg aaguggc **B**	9566	G-cleaver
1200	HCV+	CUUCCUC G UCUCUCA	4789	22747	ugagaga gccgaaagg***C***gagugaGGu***C***u gaggaag **B**	9567	Zinzyme
1211	HCV+	CUCAGCU G UUCACCU	4790	22748	aggugaa gccgaaagg***C***gagugaGGu***C***u agcugag **B**	9568	Zinzyme
2504	HCV+	UCCUGUU G CUUUUCC	4762	22749	ggaaaag gccgaaagg***C***gagugaGGu***C***u aacagga **B**	9569	Zinzyme
2651	HCV+	UCCUCGU G UUCUUCU	4763	22750	agaagaa gccgaaagg***C***gagugaGGu***C***u acgagga **B**	9570	Zinzyme
8811	HCV+	CACUCCA G UCAACUC	4764	22751	gaguuga gccgaaagg***C***gagugaGGu***C***u uggagug **B**	9571	Zinzyme
8594	HCV-	UCGCCGC G UCCUCUU	4793	22752	aagagga gccgaaagg***C***gagugaGGu***C***u gcggcga **B**	9572	Zinzyme
7985	HCV-	UCUCAGU G UCUUCCA	4765	22753	uggaaga gccgaaagg***C***gagugaGGu***C***u acugaga **B**	9573	Zinzyme
6611	HCV-	CCUCCAC G UACUCCU	4796	22754	aggagua gccgaaagg***C***gagugaGGu***C***u guggagg **B**	9574	Zinzyme
5633	HCV-	UCCACAU G UGCUUCG	4766	22755	cgaagca gccgaaagg***C***gagugaGGu***C***u augugga **B**	9575	Zinzyme
821	HCV-	UCACGCC G UCUUCCA	4767	22756	uggaaga gccgaaagg***C***gagugaGGu***C***u ggcguga **B**	9576	Zinzyme
870	HCV+	CUCUAUC U UCCUCUU	4768	22775	aagagga CUGAUGAggccguuaggccGAA lauagag **B**	9577	Inozyme
1210	HCV+	UCUCAGC U GUUCACC	4769	22776	ggugaac CUGAUGAggccguuaggccGAA lcugaga **B**	9578	Inozyme
2642	HCV+	UCCUCUC C UUCCUCG	4770	22777	cgaggaa CUGAUGAggccguuaggccGAA lagagga **B**	9579	Inozyme
5726	HCV+	UCACAGC C UCCAUCA	4771	22778	ugaugga CUGAUGAggccguuaggccGAA lcuguga **B**	9580	Inozyme
8142	HCV+	CUCCACC C UUCCUCA	4772	22779	ugaggaa CUGAUGAggccguuaggccGAA lguggag **B**	9581	Inozyme
7990	HCV-	UGGUGUC U CAGUGUC	4773	22780	gacacug CUGAUGAggccguuaggccGAA lacacca **B**	9582	Inozyme
7813	HCV-	CUUCGCC U UCAUCUC	4774	22781	gagauga CUGAUGAggccguuaggccGAA lgcgaag **B**	9583	Inozyme
7137	HCV-	ACCUCUC U CUCAUCC	4775	22782	ggaugag CUGAUGAggccguuaggccGAA lagaggu **B**	9584	Inozyme
6084	HCV-	UUCAUCC A CUGCACA	4776	22783	ugugcag CUGAUGAggccguuaggccGAA lgaugaa **B**	9585	Inozyme
2554	HCV-	CAACAGC A UCAUCCA	4777	22784	uggauga CUGAUGAggccguuaggccGAA lcuguug **B**	9586	Inozyme
1202	HCV+	UCCUCGU C UCUCAGC	4778	22943	gcugaga CUGAUGAggccguuaggccGAA Acgagga **B**	9587	Hammerhead
1607	HCV+	GGCACAU U AACAGGA	4779	22944	uccuguu CUGAUGAggccguuaggccGAA Augugcc **B**	9588	Hammerhead
2639	HCV+	GCAUCCU C UCCUUCC	4780	22945	ggaagga CUGAUGAggccguuaggccGAA Aggaugc **B**	9589	Hammerhead
6610	HCV+	GAGGAGU A CGUGGAG	4781	22946	cuccacg CUGAUGAggccguuaggccGAA Acuccuc **B**	9590	Hammerhead
9014	HCV+	GCGCAUU U UCACUCC	4782	22947	ggaguga CUGAUGAggccguuaggccGAA Aaugcgc **B**	9591	Hammerhead
8605	HCV-	GACUCGU A GGCUCGC	4783	22948	gcgagcc CUGAUGAggccguuaggccGAA Acgaguc **B**	9592	Hammerhead
7983	HCV-	UCAGUGU C UUCCAGC	4784	22949	gcuggaa CUGAUGAggccguuaggccGAA Acacuga **B**	9593	Hammerhead
7136	HCV-	CCUCUCU C UCAUCCU	4785	22950	aggauga CUGAUGAggccguuaggccGAA Agagagg **B**	9594	Hammerhead
6609	HCV-	UCCACGU A CUCCUCA	4786	22951	ugaggag CUGAUGAggccguuaggccGAA Acgugga **B**	9595	Hammerhead
6292	HCV-	CGUGCAU A UCCAGUC	4787	22952	gacugga CUGAUGAggccguuaggccGAA Augcacg **B**	9596	Hammerhead
867	HCV+	UUUCUCU A UCUUCCU	4788	22971	aggaaga GGCTAGCTACAACGA agagaaa **B**	9597	DNAzyme
1200	HCV+	CUUCCUC G UCUCUCA	4789	22972	ugagaga GGCTAGCTACAACGA gaggaag **B**	9598	DNAzyme
1211	HCV+	CUCAGCU G UUCACCU	4790	22973	aggugaa GGCTAGCTACAACGA agcugag **B**	9599	DNAzyme

5730	HCV+	AGCCUCC A UCACCAG	4791	22974	cugguga GGCTAGCTACAACGA ggaggcu **B**	9600	DNAzyme
6533	HCV+	UCAACGC A UACACCA	4792	22975	uggugua GGCTAGCTACAACGA gcguuga **B**	9601	DNAzyme
8594	HCV-	UCGCCGC G UCCUCUU	4793	22976	aagagga GGCTAGCTACAACGA gcggcga **B**	9602	DNAzyme
7810	HCV-	CGCCUUC A UCUCCUU	4794	22977	aaggaga GGCTAGCTACAACGA gaaggcg **B**	9603	DNAzyme
7133	HCV-	CUCUCUC A UCCUCCU	4795	22978	aggagga GGCTAGCTACAACGA gagagag **B**	9604	DNAzyme
6611	HCV-	CCUCCAC G UACUCCU	4796	22979	aggagua GGCTAGCTACAACGA guggagg **B**	9605	DNAzyme
2300	HCV-	CCUCCAA A UCACAAC	4797	22980	guuguga GGCTAGCTACAACGA uuggagg **B**	9606	DNAzyme
195	HCV+	GGGUCCU U UCUUGGA	4556	23072	$c_s c_s a_s a_s$ga cUGAuGaggcgWWagccGaa Aggacc **B**	9607	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	23076	WWWWW$c_s c_s a_s a_s$ga cUGAuGaggcguuagccGaa Aggacc **B**	9608	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	23077	WW$c_s c_s a_s a_s$ga cUGAuGaggcgWWWagccGaa Aggacc **B**	9609	Hammerhead
195	HCV+	GGGUCCU U UCUUGGA	4556	23086	$c_s c_s a_s a_s$ga cUGAuGaggcgWWWagccGaa Aggacc **B**	9610	Hammerhead

lower case = 2'-O-methyl
UPPER CASE = RIBO
B = inverted deoxy abasic
U = 2'-deoxy-2'-amino Uridine
C = 2'-deoxy-2'-amino Cytidine
U = 2'-deoxy-2'-amino Uridine
Z = BRdU (5-bromo-2'-deoxy Uridine)

W = acyclic galactose-amine linker

UNDERLINE = deoxy nucleotide

Table VI: Anti HCV amino containing hammerhead ribozyme and control sequences

pos	RPI#	HCV 5'UTR Site	Ribozyme Sequences (5'-3')	Core	Rz Seq ID
62	12257	HCV-62	$g_sc_sg_s$ugaa c*U*GA*U*Gaggccguuaggccgaa AcaguagB	Active	9611
79	12258	HCV-79	$a_su_sg_s$gcua c*U*GA*U*Gaggccguuaggccgaa AcgcuuuB	Active	9612
81	12249	HCV-81	$c_sc_sa_s$uggc c*U*GA*U*Gaggccguuaggccgaa AgacgcuB	Active	9613
104	12259	HCV-104	$g_sc_su_s$gcac c*U*GA*U*Gaggccguuaggccgaa AcacucaB	Active	9614
142	12250	HCV-142	$a_sg_sa_s$ccac c*U*GA*U*Gaggccguuaggccgaa AuggcucB	Active	9615
148	12251	HCV-148	$u_su_sc_s$cgca c*U*GA*U*Gaggccguuaggccgaa AccacuaB	Active	9616
165	12260	HCV-165	$u_sc_sc_s$ggug c*U*GA*U*Gaggccguuaggccgaa AcucaccB	Active	9617
192	12261	HCV-192	$a_sa_sg_s$aaag c*U*GA*U*Gaggccguuaggccgaa AcccgguB	Active	9618
195	12252	HCV-195	$u_sc_sc_s$aaga c*U*GA*U*Gaggccguuaggccgaa AggacccB	Active	9619
196	12262	HCV-196	$a_su_sc_s$caag c*U*GA*U*Gaggccguuaggccgaa AaggaccB	Active	9620
270	12263	HCV-270	$c_su_su_s$ucgc c*U*GA*U*Gaggccguuaggccgaa AcccaacB	Active	9621
282	12264	HCV-282	$g_su_sa_s$ccac c*U*GA*U*Gaggccguuaggccgaa AggccuuB	Active	9622
306	12265	HCV-306	$c_sa_sc_s$ucgc c*U*GA*U*Gaggccguuaggccgaa AgcacccB	Active	9623
325	12253	HCV-325	$u_sc_su_s$acga c*U*GA*U*Gaggccguuaggccgaa AccucccB	Active	9624
330	12254	HCV-330	$c_sa_sc_s$gguc c*U*GA*U*Gaggccguuaggccgaa AcgagacB	Active	9625
			Control Sequences		
79	13274	HCV-79 AC2	$c_su_su_s$aggu c*U*AG*U*Gaggccguuaggccgau AguucucB	Attenuated	9626
81	13271	HCV-81 AC	$u_sc_su_s$gccg c*U*AG*U*Gaggccguuaggccgau AgugaccB	Attenuated	9627
142	13270	HCV-142 AC	$a_sa_sc_s$ccug c*U*AG*U*Gaggccguuaggccgau AgcucguB	Attenuated	9628
192	13272	HCV-192 AC	$a_sg_su_s$agaa c*U*AG*U*Gaggccguuaggccgau AgcugccB	Attenuated	9629
195	13269	HCV-195 AC	$g_sa_su_s$ucca c*U*AG*U*Gaggccguuaggccgau AcgcgacB	Attenuated	9630
282	13273	HCV-282 AC	$g_sc_sc_s$auuc c*U*AG*U*Gaggccguuaggccgau AucuggcB	Attenuated	9631
330	13268	HCV-330 AC	$c_sc_sa_s$ggcu c*U*AG*U*Gaggccguuaggccgau AaugcgcB	Attenuated	9632
195	15291	HCV-195 BAC3	$u_sc_sc_s$aaga c*U*AG*U*Gacgccguuaggcgaa AggacccB	Attenuated	9633
195	15292	HCV-195 SAC3	$a_sg_sa_s$cuac c*U*AG*U*Gacgccguuaggcgaa AcccgagB	Attenuated	9634
330	15294	HCV-330 BAC	$c_sa_sc_s$gguc c*U*AG*U*Gacgccguuaggcgaa AcgagacB	Attenuated	9635
330	15295	HCV-330 SAC	$g_sc_su_s$ccga c*U*AG*U*Gacgccguuaggcgaa AgacacgB	Attenuated	9636

UPPER CASE = RIBO; lower case = 2'-O-methyl; B = inverted deoxyabasic;
s = phosphorothioate linkage
U = 2'-deoxy-2'-amino uridine

Table VII: Anti HCV site 330 antisense nucleic acid and scrambled control sequences

pos	RPI #	Alias	Antisense Nucleic Acid	Seq ID #
330	17501	HCV.5-330 antisense	$G_sT_sG_s$ $C_sT_sC_s$ $A_sT_sG_s$ $A_sT_sG_s$ $C_sA_sC_s$ $G_sG_sT_s$ C_sT	9353
330	17498	HCV.5-330 antisense	$G_sT_sG_s$ $C_sT_sC_s$ $A_sT_sG_s$ $G_sT_sG_s$ $C_sA_sC_s$ $G_sG_sT_s$ C_sT	9637

pos	RPI#	Alias	Control Sequence	Seq ID #
330	17499	HCV.5-330 scrambled	$T_sG_sA_s$ $T_sC_sA_s$ $G_sG_sT_s$ $C_sT_sG_s$ $C_sT_sG_s$ $C_sG_sT_s$ G_sC	9638
330	17502	HCV.5-330 Scrambled	$T_sG_sA_sT_sC_sA_sG_sG_sT_sC_sT_sG_sC_sT_sG_sC_sA_sT_sG_sC$	9639

UPPER CASE = Deoxy Nucleotide
s = phosphorothioate

Table VIII: In Vitro Cleavage Data, anti-HCV Enzymatic Nucleic Acids

Seq ID #	RPI#	Motif	Site (+/-)	Enzymatic Nucleic Acid Sequence	% Substrate Cleaved in 3 hours	Substrate Sequence	Seq ID #	Substrate RPI#
9587	22943	Hammerhead	1190 (+)	gcugaga CUGAUGAggccguuaggccGAA Acgagga B	89.67	UCCUCGU C UCUCAGC B	9640	22897
9588	22944	Hammerhead	1595 (+)	uccuguu CUGAUGAggccguuaggccGAA Augugcc B	90.33	GGCACAU U AACAGGA B	9641	22898
9589	22945	Hammerhead	2627 (+)	ggaagga CUGAUGAggccguuaggccGAA Aggaugc B	82.54	GCAUCCU C UCCUUCC B	9642	22899
9590	22946	Hammerhead	6598 (+)	cuccacg CUGAUGAggccguuaggccGAA Acuccuc B	78.06	GAGGAGU A CGUGGAG B	9643	22900
9591	22947	Hammerhead	9002 (+)	ggaguga CUGAUGAggccguuaggccGAA Aaugcgc B	81.88	GCGCAUU U UCACUCC B	9644	22901
9592	22948	Hammerhead	818 (-)	gcgagcc CUGAUGAggccguuaggccGAA Acgaguc B	88.34	GACUCGU A GGCUCGC B	9645	22902
9593	22949	Hammerhead	1440 (-)	gcuggaa CUGAUGAggccguuaggccGAA Acacuga B	89.16	UCAGUGU C UUCCAGC B	9646	22903
9594	22950	Hammerhead	2287 (-)	aggauga CUGAUGAggccguuaggccGAA Agagagg B	83.43	CCUCUCU C UCAUCCU B	9647	22904
9595	22951	Hammerhead	2814 (-)	ugaggag CUGAUGAggccguuaggccGAA Acgugga B	83.25	UCCACGU A CUCCUCA B	9648	22905
9596	22952	Hammerhead	3131 (-)	gacugga CUGAUGAggccguuaggccGAA Augcacg B	86.96	CGUGCAU A UCCAGUC B	9649	22906
9597	22971	DNAzyme	855 (+)	aggaaga GGCTAGCTACAACGA agagaaa B	92.11	UUUCUCU A UCUUCCU B	9650	22925
9598	22972	DNAzyme	1188 (+)	ugagaga GGCTAGCTACAACGA gaggaag B	86.38	CUUCCUC G UCUCUCA B	9651	22926
9599	22973	DNAzyme	1199 (+)	aggugaa GGCTAGCTACAACGA agcugag B	83.15	CUCAGCU G UUCACCU B	9652	22927
9600	22974	DNAzyme	5718 (+)	cugguga GGCTAGCTACAACGA ggaggcu B	57.82	AGCCUCC A UCACCAG B	9653	22928
9601	22975	DNAzyme	6521 (+)	uggugua GGCTAGCTACAACGA gcguuga B	75.77	UCAACGC A UACACCA B	9654	22929
9602	22976	DNAzyme	829 (-)	aagagga GGCTAGCTACAACGA gcggcga B	66.06	UCGCCGC G UCCUCUU B	9655	22930
9603	22977	DNAzyme	1613 (-)	aaggaga GGCTAGCTACAACGA gaaggcg B	71.28	CGCCUUC A UCUCCUU B	9656	22931
9604	22978	DNAzyme	2290 (-)	aggagga GGCTAGCTACAACGA gagagag B	61.60	CUCUCUC A UCCUCCU B	9657	22932
9605	22979	DNAzyme	2812 (-)	aggagua GGCTAGCTACAACGA guggagg B	85.53	CCUCCAC G UACUCCU B	9658	22933
9606	22980	DNAzyme	7123 (-)	guuguga GGCTAGCTACAACGA uuggagg B	34.60	CCUCCAA A UCACAAC B	9659	22934
9557	22719	G-cleaver	1438 (+)	uggaaga uGAUg gcauGcacuaugc gCg acugaga B	69.88	UCUCAGU G UCUUCCA B	9660	22813
9558	22720	G-cleaver	4591 (+)	ggagagg uGAUg gcauGcacuaugc gCg auauaca B	77.74	UGUAUAU G CCUCUCC B	9661	22814
9559	22721	G-cleaver	5270 (+)	ucuaagg uGAUg gcauGcacuaugc gCg acacggu B	47.37	ACCGUGU G CCUUAGA B	9662	22815
9560	22722	G-cleaver	6223 (+)	accaccu uGAUg gcauGcacuaugc gCg acuccac B	75.84	GUGGAGU G AGGUGGU B	9663	22816
9561	22723	G-cleaver	7741 (+)	acagguu uGAUg gcauGcacuaugc gCg aacucgu B	61.58	ACGAGUU G AACCUGU B	9664	22817
9562	22724	G-cleaver	884 (-)	ggauggu uGAUg gcauGcacuaugc gCg agacagg B	65.16	CCUGUCU G ACCAUCC B	9665	22818
9563	22725	G-cleaver	2492 (-)	ggaaaag uGAUg gcauGcacuaugc gCg aacagga B	94.66	UCCUGUU G CUUUUCC B	9666	22819
9564	22726	G-cleaver	2639 (-)	agaagaa uGAUg gcauGcacuaugc gCg acgagga B	82.14	UCCUCGU G UUCUUCU B	9667	22820
9565	22727	G-cleaver	4082 (-)	ggacgag uGAUg gcauGcacuaugc gCg acuuugu B	67.20	ACAAAGU G CUCGUCC B	9668	22821

9566	22728	G-cleaver	8958 (-)	gguaggu uGAUg gcauGcacuaugc gCg aaguggc B	81.06	GCCACUU G ACCUACC B	9669	22822

9567	22747	Zinzyme	1188 (+)	ugagaga gccgaaaggCgagugaGGuCu gaggaag B	66.11	CUUCCUC G UCUCUCA B	9670	22841
9568	22748	Zinzyme	1199 (+)	aggugaa gccgaaaggCgagugaGGuCu agcugag B	80.28	CUCAGCU G UUCACCU B	9671	22842
9569	22749	Zinzyme	2492 (+)	ggaaaag gccgaaaggCgagugaGGuCu aacagga B	90.80	UCCUGUU G CUUUUCC B	9672	22843
9570	22750	Zinzyme	2639 (+)	agaagaa gccgaaaggCgagugaGGuCu acgagga B	80.64	UCCUCGU G UUCUUCU B	9673	22844
9571	22751	Zinzyme	8799 (+)	gaguuga gccgaaaggCgagugaGGuCu uggagug B	14.85	CACUCCA G UCAACUC B	9674	22845
9572	22752	Zinzyme	829 (-)	aagagga gccgaaaggCgagugaGGuCu gcggcga B	27.83	UCGCCGC G UCCUCUU B	9675	22846
9573	22753	Zinzyme	1438 (-)	uggaaga gccgaaaggCgagugaGGuCu acugaga B	89.39	UCUCAGU G UCUUCCA B	9676	22847
9574	22754	Zinzyme	2812 (-)	aggagua gccgaaaggCgagugaGGuCu guggagg B	50.40	CCUCCAC G UACUCCU B	9677	22848
9575	22755	Zinzyme	3790 (-)	cgaagca gccgaaaggCgagugaGGuCu augugga B	81.10	UCCACAU G UGCUUCG B	9678	22849
9576	22756	Zinzyme	8602 (-)	uggaaga gccgaaaggCgagugaGGuCu ggcguga B	73.47	UCACGCC G UCUUCCA B	9679	22850

9577	22775	Inozyme	858 (+)	aagagga CUGAUGAggccguuaggccGAA Iauagag B	87.74	CUCUAUC U UCCUCUU B	9680	22869
9578	22776	Inozyme	1198 (+)	ggugaac CUGAUGAggccguuaggccGAA Icugaga B	84.55	UCUCAGC U GUUCACC B	9681	22870
9579	22777	Inozyme	2630 (+)	cgaggaa CUGAUGAggccguuaggccGAA Iagagga B	90.12	UCCUCUC C UUCCUCG B	9682	22871
9580	22778	Inozyme	5714 (+)	ugaugga CUGAUGAggccguuaggccGAA Icuguga B	83.77	UCACAGC C UCCAUCA B	9683	22872
9581	22779	Inozyme	8130 (+)	ugaggaa CUGAUGAggccguuaggccGAA Iguggag B	82.22	CUCCACC C UUCCUCA B	9684	22873
9582	22780	Inozyme	1433 (-)	gacacug CUGAUGAggccguuaggccGAA Iacacca B	87.33	UGGUGUC U CAGUGUC B	9685	22874
9583	22781	Inozyme	1610 (-)	gagauga CUGAUGAggccguuaggccGAA Igcgaag B	70.67	CUUCGCC U UCAUCUC B	9686	22875
9584	22782	Inozyme	2286 (-)	ggaugag CUGAUGAggccguuaggccGAA Iagaggu B	78.83	ACCUCUC U CUCAUCC B	9687	22876
9585	22783	Inozyme	3339 (-)	ugugcag CUGAUGAggccguuaggccGAA Igaugaa B	86.93	UUCAUCC A CUGCACA B	9688	22877
9586	22784	Inozyme	6869 (-)	uggauga CUGAUGAggccguuaggccGAA Icuguug B	90.41	CAACAGC A UCAUCCA B	9689	22878

In vitro cleavage in 50 mM Tris-Cl, pH 8.0, 40 mM Mg^{2+} at 37°, using trace substrate, and enzymatic nucleic acid concentration of 500 nM or greater.

UPPER CASE = RIBO
UNDERLINED = DEOXY
lower case = 2'-O-methyl
B = inverted deoxyabasic
C = 2'-amino C
(+/-) = plus strand/minus strand of HCV genome

All patents and publications mentioned in the specification are indicative of the levels of skill of those skilled in the art to which the invention pertains. All references cited in this disclosure are incorporated by reference to the same extent as if each reference had been incorporated by reference in its entirety individually.

One skilled in the art would readily appreciate that the present invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those inherent therein. The methods and compositions described herein as presently representative of preferred embodiments are exemplary and are not intended as limitations on the scope of the invention. Changes therein and other uses will occur to those skilled in the art, which are encompassed within the spirit of the invention, are defined by the scope of the claims.

It will be readily apparent to one skilled in the art that varying substitutions and modifications may be made to the invention disclosed herein without departing from the scope and spirit of the invention. Thus, such additional embodiments are within the scope of the present invention and the following claims.

The invention illustratively described herein suitably may be practiced in the absence of any element or elements, limitation or limitations which is not specifically disclosed herein. Thus, for example, in each instance herein any of the terms "comprising", "consisting essentially of" and "consisting of" may be replaced with either of the other two terms. The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention that in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed. Thus, it should be understood that although the present invention has been specifically disclosed by preferred embodiments, optional features, modification and variation of the concepts herein disclosed may be resorted to by those skilled in the art, and that such modifications and variations are considered to be within the scope of this invention as defined by the description and the appended claims.

In addition, where features or aspects of the invention are described in terms of Markush groups or other grouping of alternatives, those skilled in the art will recognize that

the invention is also thereby described in terms of any individual member or subgroup of members of the Markush group or other group.

Other embodiments are within the following claims.